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Washington Highlights

Bureau of Mines latest available petroleum statistics revealed that the nation's crude production averaged 5,264,789 barrels daily, compared with 4,703,475 barrels in the like period of 1946. Gasoline stocks amounted to 86,968,000 barrels. This was a gain of 749,000 barrels over the preceding week.

O. A. Knight, president of the Oil Workers International Union, has announced that a new wage program for the country's oil workers will be drafted by the Union's wage policy committee in January. He said the action was the result of the continued rise in the cost of living.

Total registration of motor vehicles in the United States as of December 31, 1947, will approximate 37,165,000, an increase of 2,972,000 over 1946. This registration is 2,324,000 greater than in the prewar peak year of 1941. Currently, there are 6,492,000 trucks on American highways, an increase of 32 per cent over 1941. Buses in operation aggregate 127,400, a rise of 26 per cent. Gasoline consumption for the full 1947 year is estimated at 833,900,000 barrels, or 6.8 per cent higher than in 1946 and 20 greater than in 1941.

Walter S. Hallanan, chairman of the National Petroleum Council, in an appearance before the House committee on interstate and foreign commerce, explained the fundamental reason for the record demand for oil products, now running at the annual rate of 2,000,000,000 barrels.

He said the reason is because the oil industry has been called upon to carry the burden of the great increase in the nation's energy requirements in the last 25 years. The oil executive stated that the shift from coal to oil was shown by the fact that coal production last year was less than 1920, while in the same period the country's oil output rose from 442,000,000 to 1,733,000,000 barrels.

"The present record demand for oil is not an abnormal nor temporary condition," he continued. "It is the natural outgrowth of our great industrial expansion and the desire of the American people to improve their standard of living, both of which involve a greater use of petroleum products."

Mr. Hallanan pointed out that the present inordinate demand upon the industry had come at a time "when the industry is still struggling under the accumulated effects of a rigidly controlled wartime economy."

The Senate appropriations committee has heard Edwin W. Pauley, Los Angeles oil man and Democratic party leader explain in detail his transactions on the wheat market and other futures.

He testified that he made "substantial profit" in these transactions, which were entirely legal. These holdings in the grain and other future markets were liquidated by Pauley after he took his present temporary post as special assistant to Army Secretary Kenneth C. Royall.

Royall in turn told the Senate committee that the Los Angeles oil man disclosed when he was named to the present office that he was in the commodity market and immediately took steps to dispose of his holdings as speedily as practical under the Capital Gains Tax laws.

At a press conference, prior to the Senate hearing, Pauley said: "Others have declined to enter public service because they have been unwilling to make the financial sacrifice which I have made. They have been unwilling also to subject themselves to the purposeful distortion of motives which I knew would be forthcoming."

Congress has received a resolution from the California Park Commission urging legislation to reverse the recent decision of the Supreme Court on tidelands, which it charged threatened the recreation of 23,000,000 persons.

The High court ruled last June that the submerged coastal lands from which California has received millions of dollars in revenue from oil royalties, is Federal property. Approximately 70 per cent of this revenue goes to the state park commission annually for the upkeep of beaches, parks and other recreational areas.

In short, the California commission asked Congress to remove the cloud that has been placed by the Supreme Court decision on ownership of tidelands within the respective boundaries of California and other states.

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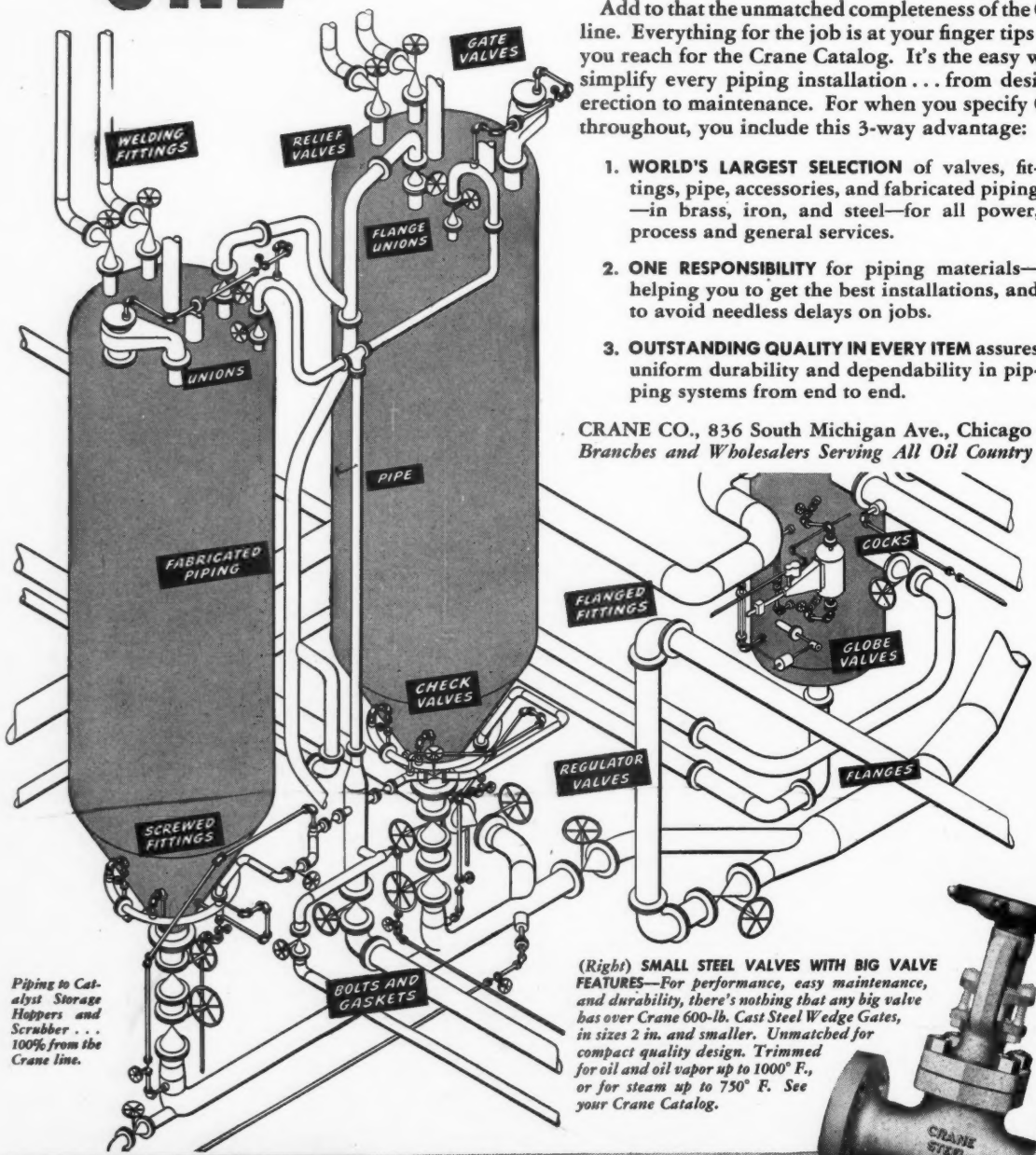

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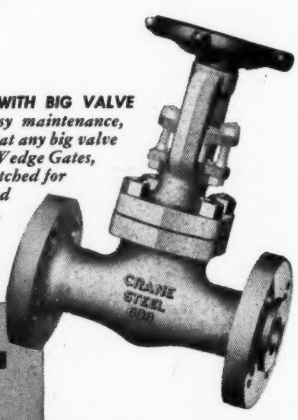

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Shell Develops Completely Portable Electric Drilling Rig

A completely portable electric oil well drilling rig capable of boring two miles into the earth has been developed and put into operation by Shell Oil Company, Incorporated, in its mountainous Ventura, California, fields.

The unit's complete mobility, heretofore impossible in the hilly terrain of the Southern California coastal region, is expected to check rising drilling costs and increase the rate of well completions, according to S. F. Bowlby, Shell's Los Angeles vice-president.

The result of two years of engineering research and experimentation, the new unit was designed and built at an overall cost of $250,000, which exceeds the investment in a conventional rig of similar horsepower by about $65,000.

Despite rising labor and material costs the new rig on an average will save $5,000 in the cost of drilling a single oil well, it was estimated by Shell engineers. It is the first completely portable 900 H.P. rig and is designed for drilling to depths of 10,000 feet.

In the early stages of study, two years ago, Shell's engineers reasoned that the following facts should control the design of the new equipment:

1. A more easily moved mast was necessary.
2. Bases should be lighter in weight.
3. All heavy equipment should be near truck height for easy handling.
4. All possible attendant equipment should be wheel-mounted.
5. Ample clearance had to be provided for blowout preventers without digging deep cellars.
6. The need for highly accurate alignment of bases, drawworks, and attendant equipment should be reduced to a minimum.

During the planning stage, it was estimated that the additional cost of drilling rig incorporating the above features would be about $65,000. Despite this increase in initial cost, however, the planners were able to project a relatively short pay-out period from the savings in moving costs alone.

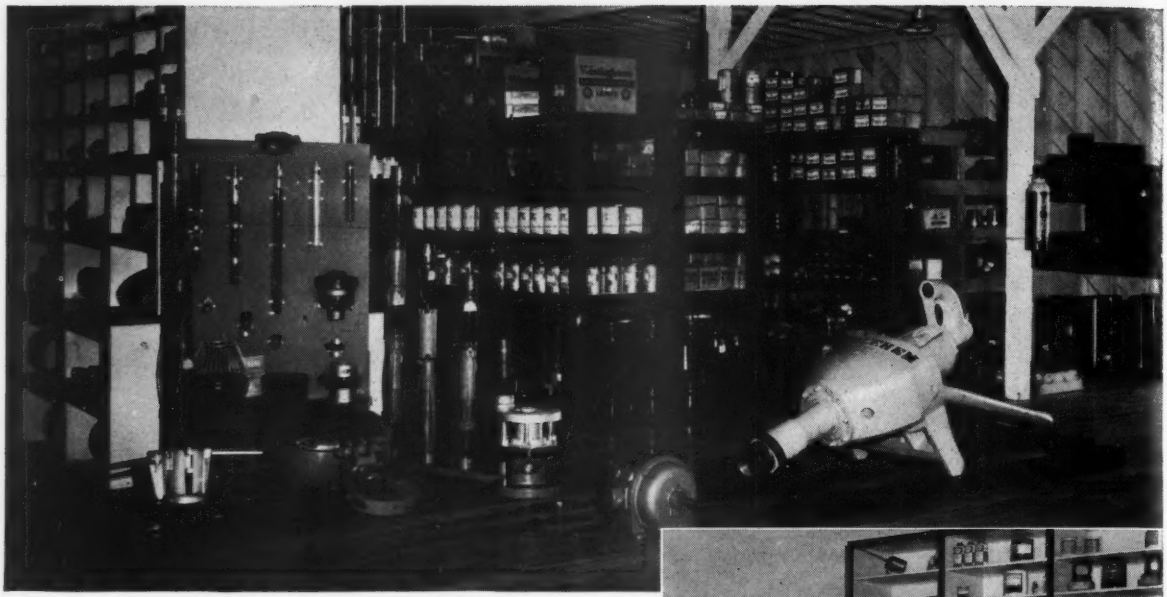
Preliminary Study

A complete set of models showing the over-all construction of the mast, light-weight bases, drawworks, and drawworks turntable was constructed before any other work was started. Experiments conducted with these models proved that the original ideas for the rig were sound.

An examination of existing drilling derricks and masts did not reveal a unit that could be moved in one piece and yet be used for fast drilling to 10,000 feet. This problem was overcome when Waldrip Engineering Company designed a new derrick that met Shell's needs. Additionally, Waldrip devoted time and engineering talent to designing and perfecting the bases, controls, and special equipment needed on the rig.

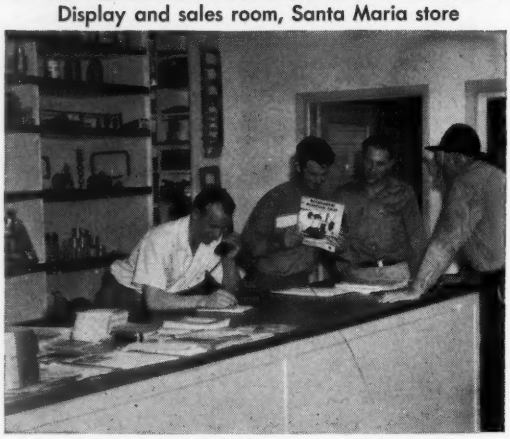
Placing the heavier equipment at truck height is something many oil men have done, but each had to be satisfied with less efficient operation to achieve this desired ease in moving. Shell's engineers recognized three alternatives: they would have to sacrifice headroom under the derrick, or have the drawworks at an elevation well above the desired truck height, or design a special drawworks setup. They chose the latter, setting the drawworks under the derrick floor and extending the catshaft up to derrick floor working height. Emsco Derrick & Equipment Company designed this special piece of equipment and worked out controls that would allow the driller to maintain control of all functions from the derrick floor. The use of air clutches, hydraulic drawworks brakes and eddy-current brakes all helped make this installation possible and actually

The power plant, viewed from the top of the derrick, includes three 12-cylinder engines and three direct current 200 kw generators.



One of the stockrooms, Bakersfield store

Display and sales room, Santa Maria store



Sales room with office in rear, Taft store

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made it practical for the driller to operate while seated at a central-control panel.

The drilling bases had to be reduced in weight. By making two radical changes all the weight of the drill pipe and rotary table was removed from the bases. A light-welded truss, four-piece base was constructed which can be moved on one semi-trailer as a legal load, and it is sufficiently sturdy to safely handle all loads imposed on it. The four-piece base also incorporated all drilling plumbing, mud ditch, and auxiliary power equipment. It is designed for easy erection with a minimum of alignment trouble.

Freuhauf Trailer Company worked closely with the Shell personnel, and by the cooperation of these organizations, as well as the rig and derrick manufacturers, it was possible to mount all major pieces of equipment other than the derrick, bases, and drawworks on their own permanent wheels. Numerous supply companies and manufacturers contributed valuable assistance.

The location of the drawworks below the derrick floor paved the way for providing head room to install blowout preventers without digging deep cellars.

A more detailed study of the rig shows how the engineers and field personnel of Shell have solved the problem faced two years ago.

Derrick

A twin-mast derrick having a height of 123′ from the base of the water table to the top of the derrick floor is the most spectacular single piece of equipment as the rig is approached. This is the first installation of this type of derrick that has 300,000 capacity and yet can be moved over the California highways in a single legal package. The derrick is a fabricated "A" frame which is a stable structure that does not require guy lines for structural support. A derrick of similar design having a 460,000 pound hook-load capacity is now on the drawing board.

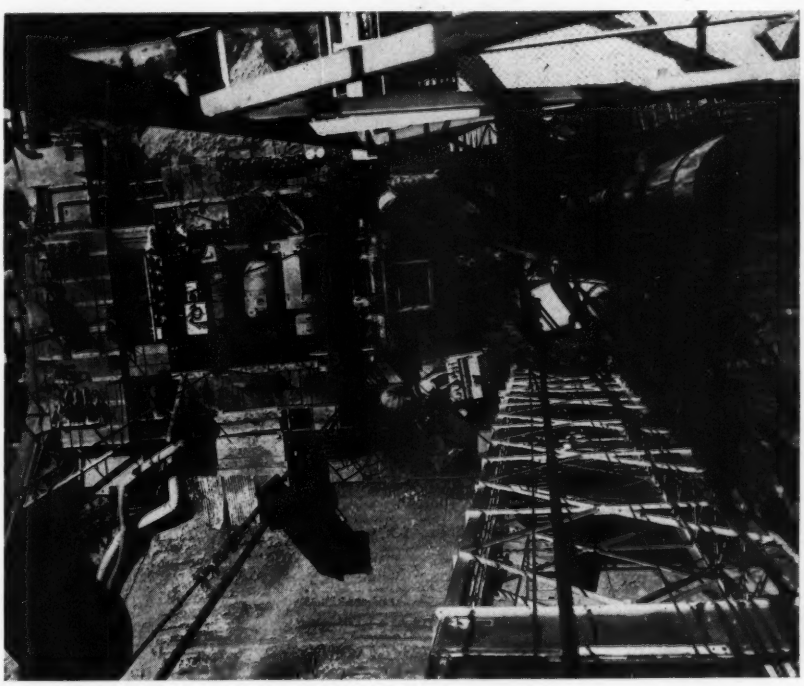
The derrick does not have any cross braces between the two fabricated legs of the "A" frame. This gives the driller a clear view of the blocks and derrick man at all times. The tubing platform is the only piece added to the derrick after erection. This element is raised in a single piece with the traveling block.

The derrick with the blocks strung is compacted into a single 8′ x 8′ x 63′ piece for legal moves over the highways. It weighs approximately 36,000 pounds. Many safety devices have been incorporated into the mechanism for erecting this derrick. Elevating and lowering the telescoped derrick is done by large hydraulic rams. The rams are equipped with outlet orifices that control the speed at which the oil can be drained from the cylinders. This in turn controls the speed at which the derrick can descend even when the oil lines are disconnected. The rams must raise the derrick load off the rear locking pins before lowering the derrick to the horizontal. This prevents lowering the derrick when the rams are not in proper working order. The derrick is extended and telescoped by means of two electric motors driving four sprockets through worm reduction gears. The motors are mounted in the base of the upper section of the derrick and the rotation of the sprockets cause the upper section to climb four chains mounted in the lower section. The worm gear acts as a brake and holds the upper section in position if the power is turned off. Safety latches are also built into the lower section to catch the upper section should any series of mechanical failures tend to cause it to drop. The upper section is locked into place when fully extended by means of safety latches.

The derrick has a 16-foot spread between the legs and the tubing platform, and it has the capacity to rack 10,000 feet of 4½ inch drill pipe.

Underfloor Drawworks

Other drilling companies have mounted much of their heavy drilling equipment at truck height to simplify moving, and Shell has used this plan with satisfaction with lighter rigs. This is the first time that anyone has designed and built a rig with a high (11′ 6″) derrick floor and the drawworks lowered to truck height. Placing the Emsco JA-1000 drawworks at truck height necessitated mounting it under the derrick floor level which raised three major problems. First, remote controls had to be developed; second, the catheads had to be raised on a special shaft several feet above



The derrick man's view of the rig floor showing the hoist, mud suction tanks, the chemical trailer as well as the driller at the console.

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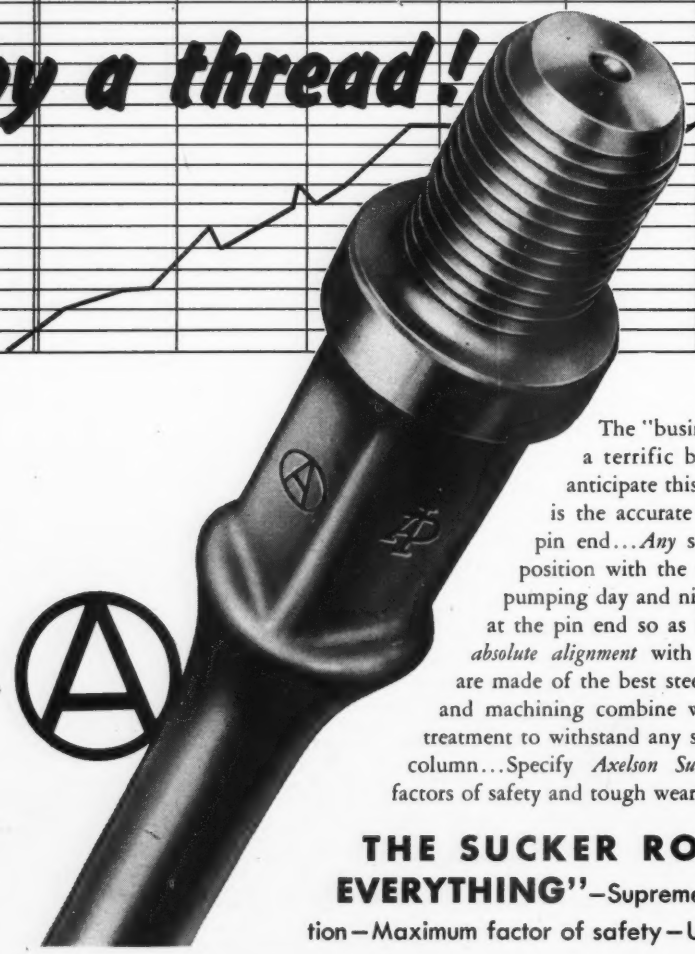

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their normal location; and third, the drawworks must be adapted to easy installation and removal from the rig.

The widespread use of air clutches simplified the clutch control problem. They were already controlled by simple air valves which could be mounted at any convenient position. Hydraulic drawworks brakes have been used in the Ventura fields and have proved their practicability, although remote controls had not been used. A high pressure boosting pump with valves to control the pressure applied to the brakes solved the remote brake control problem. One of the most difficult control problems was in connection with the speed control of the hoisting and rotary table electric motors. These controls normally require rotation of the rheostadt wheel a full 330 degrees to obtain a wide range of speeds both forward and reverse. Hydraulic truck steering controls, together with conventional master and slave hydraulic controls, solved the electric motor speed control problem after several tries. The final result was a control desk located well to the side and rear of the derrick floor where the driller sits. From this desk he is able to control all drilling operations with a minimum of effort. The resulting control desk looks simple, but many hours of top-flight engineering skill went into the design.

The raised catshaft is the most unique feature of the physical appearance of the drawworks. This drive has been elevated to bring the catheads to a convenient working height above the 11′ 6″ derrick floor while the drawworks is located on the 4′ high longitudinal bases. An air controlled spinning cathead is installed on the rotary end of the catshaft and an air controlled master breakout cathead on the driller's end.

The sand-reel is actually a part of the selective speed transmission package, but its redesign was tied in with the design of the drawworks. In order to move the selective speed package and keep it within the 8′ road width limit, it was necessary to do a considerable amount of redesign work. The conventional sand-reel with its airflex clutch was used, but it was rotated through 180 degrees and the drive to the sand-reel changed. This is one of the smaller changes required in the over-all construction of the rig, but it shows how the over-all accomplishment was a result of close cooperation and willingness to make any possible changes in order to achieve the desired results.

Drawworks Turntable

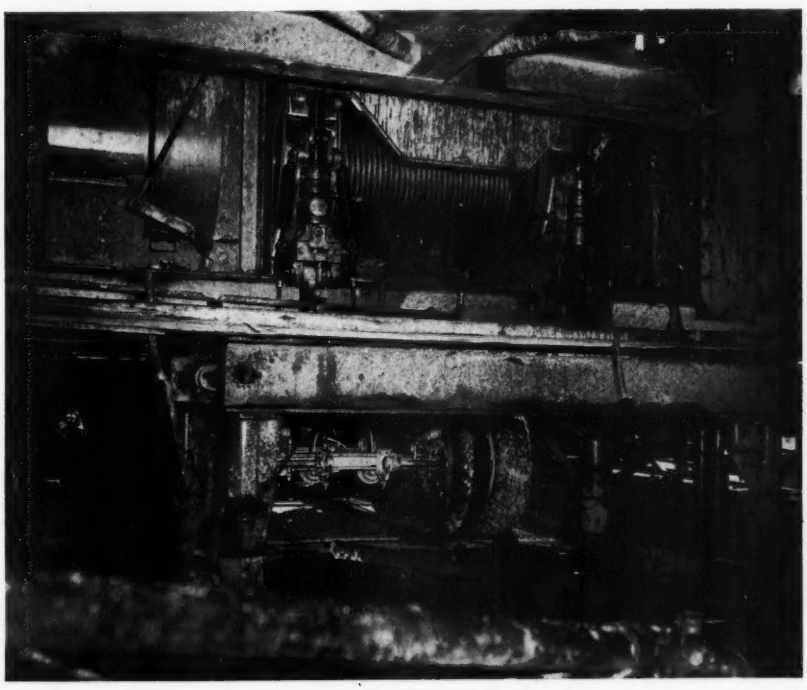
The drawworks is mounted on a permanent turntable, with the pivot point of the turntable at the center of gravity of the drawworks to facilitate further moving. This device is a part of the lightweight bases and yet a part of the over-all design of the drawworks. The turn-table provides for an easy method of rotating the drawworks from the longitudinal legal hauling position to the conventional drilling position. The truck backs into an open space between the two longitudinal truss subbases with the longitudinal axis of the drawworks parallel to the longitudinal axis of the truck. The drawworks is then swung through 90 degrees on the turntable and the truck backed further until the drawworks is in its final position. At this point, hydraulic jacks and trusses built into the subbase lift the drawworks and turntable clear of the truck and the truck pulls away. Adjustable supporting legs which have been hinged up into the turntable base are then lowered to the vertical position and the hydraulic jacks lowered. This leaves the drawworks supported on its own base, and the installation is made accurately and without the need of any cranes or other outside equipment.

In moving out, the process is reversed with the hydraulic jacks lifting the drawworks and then folding the drawworks base legs up into the turntable. All is then clear for the truck to back into the open space between the longitudinal bases and to lower the turntable and the drawworks onto the truck body. No cranes are needed for this operation.

Drill Pipe Loads Removed From Base

Two major changes in practice were made before the lightweight bases could be considered. First, it was necessary to remove the weight of racked drill pipe from the bases; and second, it was necessary to remove the weight of the rotary table and suspended pipe from the bases.

The weight of the drill pipe is removed by racking all pipe on the



Raised and lowered by special hydraulic jacks, the drawworks are mounted on a permanent turntable and placed in position directly from the truck bed, eliminating the use of cranes for this operation.

ground. A special drill pipe racking chute had to be developed to rack pipe on the ground when drilling from an 11′ 6″ derrick floor. This chute consists of a steel slide or chute pivoted at a point as near the table as possible. The bottom end of the chute is movable in any direction by means of three jack screws driven by remote controlled hydraulic motors. The bottom of the drill pipe chute is positioned prior to installing a stand of pipe in the chute. Every stand of pipe enters the chute at the same point with respect to the rotary table as the chute is pivoted at this point. This has two advantages. First, the derrick floor man always releases the drill pipe at the same point, and this point is the one demanding least physical exertion. Second, the design of a mechanical pipe breaking device has been considered, and its design would be greatly simplified with the chute as it would always discharge the pipe at a given point.

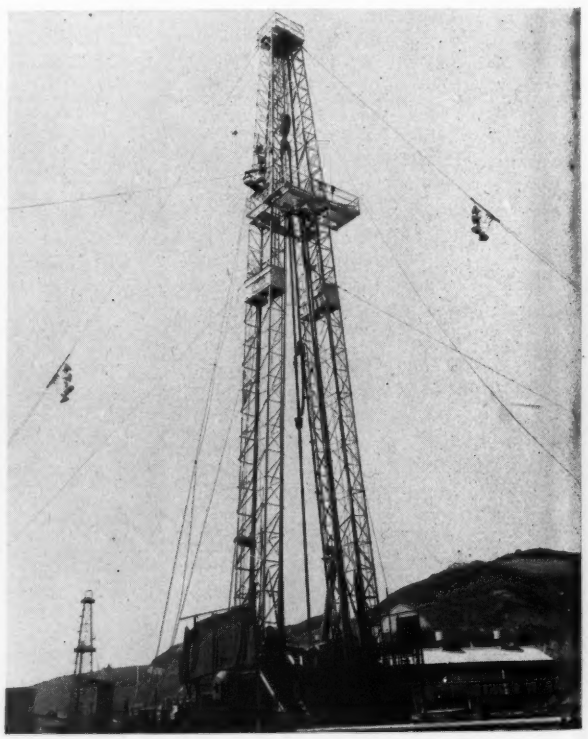
The weight of the rotary table with a long string of drill pipe suspended from the slips imposes great loads on the subbases. This load is imposed directly over the hole at a point where maximum clearance is desired for blow-out preventers and mud discharge pipes. Shell studied this problem and realized that their subbases could not be made of lightweight construction if this practice were followed. A plan was devised of supporting the rotary table on the drilling riser, taking all the load into the cellar through the blowout preventers and other portions of the drilling riser. This plan was perfected by careful consultation with the manufacturers of blowout preventers and rotary table manufacturers. Special cylindrical guides fixed to the drilling riser position the table and transmit all torque loads to the drilling riser and the torque in turn is passed on to the bases by means of tie rods. The drilling load encountered while drilling surface hole, before the blowout prevention equipment is installed, is carried on the truss base. The cylindrical rotary table guides, in conjunction with the independent rotary table drive, make it easy to remove the table while setting surface casing or when other special operations require clearance to the hole.

Lightweight Subbases

Shell sought a drilling base that could be constructed in four pieces, light in weight, and so designed that it could be moved in a legal load on a single semi-trailer. Taking all of the major drilling loads from the subbase and directing them directly into the ground made this desire possible. The base is constructed of two longitudinal truss sections approximately 4′ x 4′ x 45′ and two cross truss sections 5′6″ wide and 7′6″ tall on the ends and with 5′ deep truss sections and 24′ long. The two cross truss sections are placed 5′ apart which provides the derrick with a 16′ wide x 30′ long floor. By reducing the central section of the cross truss section to 4′6″ in depth, it is possible to obtain an 11′6″ high derrick floor and yet maintain 7′0″ head room under the drilling floor.

The bases are equipped with conical self-aligning pins and sockets to insure perfect alignment with a minimum of trouble. The longitudinal bases are set parallel and in the proper location with respect to the hole center, and the cross truss

A. H. (Al) Curry, Shell construction and maintenance foreman, pictured at the hydraulic controls lowering the 18-ton telescoped derrick.



The twin-mast derrick, 123 feet high, has capacity to rack 10,000 feet of drill pipe. The working area is illuminated by 16 flood lights.

sections are then set in place guided by the conical pins. All drilling, plumbing, and electrical connections are carried from the longitudinal bases to the cross base and thence to the derrick by means of quick acting couplings. Rapid assembly of unions and fittings is assured by this positive method of lining up the respective sections of the base.

The left-hand longitudinal base carries the fluid pump, electric motor, and fluid reservoir tank. This unit supplies the power to the drill pipe racking chute hydraulic motors. The same power is used for operating the hydraulic jacks required in locating the drawworks and the hydraulic rams used to raise the derrick to the vertical. It can be used in an emergency to supply power to the drawworks hydraulic brakes and other hydraulic controls. This same section of longitudinal base also contains the stand pipe manifolding.

The right-hand longitudinal base contains an air receiver, and it is used to support the removable mud ditch.

Rotary Table Drive

The rotary table has been mounted on the drilling riser, as mentioned, to take the drilling loads off the derrick bases. The table is driven by a 250 H.P. direct current electric motor which is located below the derrick floor and between the transverse bases. The drive from the motor to the table is by means of a drive shaft equipped with universal joints. The table itself is set almost flush with the derrick floor, and the lock pawls are remotely controlled by air from the driller's control desk. The use of a separate rotary table motor provides the crew with a derrick floor clear of guards, and it allows the drawworks motor to remain idle while rotating.

Wheel-Mounted Units

Two slush pumps with their entire drives, one double mud tank, one chemical tank, three internal combustion engines and generators, the change house, and the drawworks speed selection transmission and drawworks motor are all mounted on wheels. In fact, the only units not permanently mounted on either full-or semi-trailers, in addition to conventional tanks and racks, are the mast, which is moved as one piece; the drawworks, which has special loading equipment; and the four-piece subbase, which can be moved on a single semi-trailer.

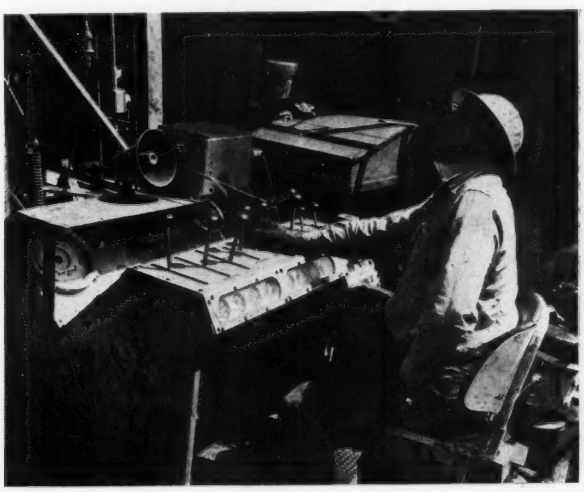
The slush pumps and their drives are the first major pieces to be moved away from the location when moving out and the last to be located when rigging up at a new location. These items have been mounted on full trailers that can be moved by any handy truck and which can easily be disconnected and set to one side while waiting for the balance of the equipment to move. The pump trailers are built as a part of the pump frames, and they are very low slung. Eight 10.00 x 15 tires carry the load, and there is only about 12 inches road clearance.

The generators and their prime movers are located out of the way, and they can be moved at almost any time. They are mounted on two semi-trailers as it will generally be possible to move them in one continuous move directly from the old to the new location. They are carried on two-axle semi-trailers supported on eight 8.25 x 15 tires.

The drawworks motor and selective speed transmission are mounted on a three-axle trailer that also includes the cable terminal board and electrical instruments and controls. This trailer is 4′ high at the top of the base supporting the transmission, and hinged extensions are installed on each side of the trailer. When these hinged extensions are lowered, they form a platform that closes the openings between this trailer and the longitudinal bases. All nonoccupied floor space on this unit is covered with light weight, open-mesh, steel flooring. Twelve 9.00 x 20 tires carry the load of this unit.

The double mud tank used as a pump suction tank is unique in that it is mounted on a single trailer axle to form a semi-trailer. This unit is made with the bottom of the tank supports about 4 inches off the ground. Steel beam sections are hinged to the bottom of this

W. C. (Bill) Thompson, Shell drilling foreman, Ventura, pictured at the central control panel which is mounted permanently on a semi-trailer unit together with one natural gas engine and generator.



At the console the driller operates this all-electric outfit from his stationary "pilot's" seat. He is aided by numerous electronic devices.

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USE BJ POWER SLIP INSERTS with BJ Power Slips. They have the same kind of built-in quality you'll always find in BJ Tong Dies. These replaceable inserts have teeth which are designed for positive, uniform grip without crushing or otherwise damaging drill pipe, casing or tubing — even when the heaviest strings are being handled.

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trailer in such a way that they can be swung under the tank for support. When the tank is empty and the front end is raised onto the fifth wheel of a tractor truck, the combination of fifth wheel lift and rear trailer spring lift clears these steel supports, and they can be swung up out of the way.

An abundance of chemicals is required in Ventura drilling, particularly when using oil base mud. Shell designed a mud chemical tank that is also mounted on a semi-trailer axle and equipped with a gooseneck for hauling. This tank is covered at truck height so that dry chemicals can readily be unloaded from the trucks. It also includes a series of tanks where premixed liquid chemicals are stored and a chemical pump which can be controlled from the drillers' position. This wheel mounted unit should adequately take care of most drilling mud supply problems, and yet it will be easy to move. It and the mud tank unit are each mounted on single axles equipped with four 7.50 x 15 tires.

Under-Floor Clearance

The subbase design has solved the problem of under-floor clearance. An 11'6" derrick floor with no posts under the rotary table allows Shell to mount the heaviest capacity blow-out prevention equipment without trouble. The 7'0" clearance under the balance of the drilling floor allows the crew to work without discomfort when rigging up, setting blow-out preventers, and performing other necessary tasks under the floor.

Electrical Equipment

Shell does not feel that an internal combustion electric generator drive is the only one that can be used with this type of drilling equipment, but this type of electrical drive semed most suitable for the Ventura operations. Locations are hilly and expensive in this field, and the ability to locate the prime movers and generators at a distance and not necessarily on the same grade with the drilling equipment will save costly excavation. These units can also be moved as a unit, and the connections from the generators to the control box can be handily made with electrical cables equipped with quick engaging polarized plugs and receptacles.

The prime movers and generators are mounted on two semi-trailers. One 12-cylinder, Hall Scott Industrial Defender, natural gas engine, its Westinghouse 200 kw direct current generator, and the control panel are mounted on one semi-trailer. The other two 12-cylinder engines and their 200 kw generators, along with two air compressors and their electric motor drives, are mounted on the other semi-trailer.

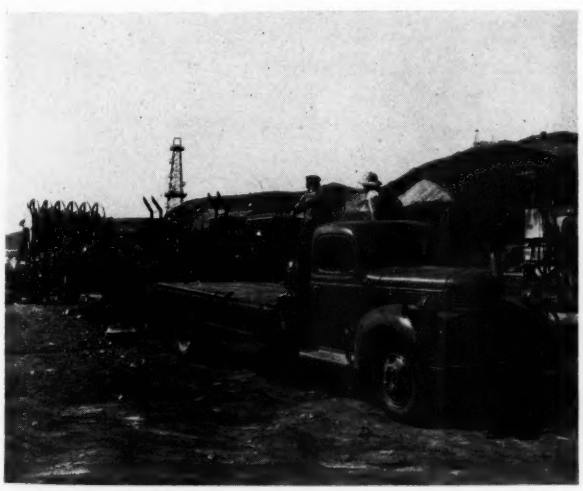
Each of the three direct current generators are rated at 200 kw, 395 Volts, 506 Amps at 1450 R.P.M. with separate excitation from a 15 kw generator mounted on the frame of the main generator.

The larger of the slush pumps is powered by a 400 H.P., 395 Volt, 820 Amp direct current electric motor operating at 900 R.P.M. The second pump is powered by a 250 H.P., 395 Volt, 510 Amp direct current motor.

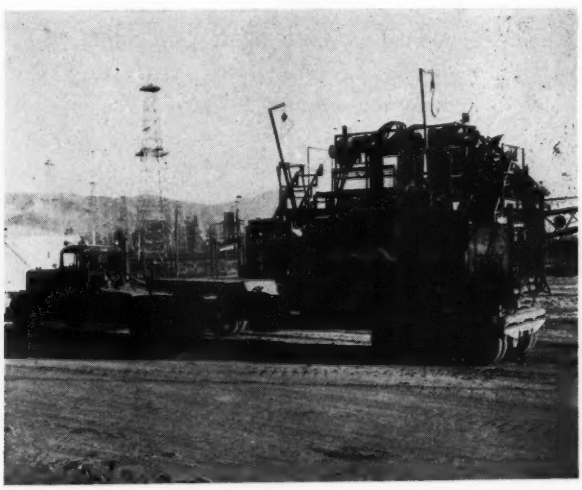
The drawworks is powered by a 500 H.P., 395 Volt, 1,020 Amp direct current motor operating at 750 R.P.M. and the rotary table by a 250 H.P., direct current motor.

In normal hoisting operations, all three generators will be compounded into the drawworks motor. In drilling it will be customary to compound two generators into one or both pumps, and the third will furnish power to the rotary table motor. When power is required on the drawworks while drilling, the driller will cut one of the generators from the pumps and divert its power into the drawworks motor. These changes can all be made by the driller at the control console on the derrick floor.

Several smaller direct current motors are also used. It is Shell's plan to utilize direct current on all continuous duty motors and alternating current on all motors used but a small portion of the time and those motors used in raising the derrick. Conditions have made it impossible to obtain some of the small direct current motors and alternating current motors are being used temporarily. A 3 H.P., continuous duty motor drives the vaned



Another step in the moving operation is to wind up the electrical cables on this specially-designed reel. All cables are equipped with quick-engaging polarized plugs and receptacles.



The drawworks, complete with walkways, stairs and raised catheads, all mounted on the turntable, being transported on a three-axle semi-trailer.

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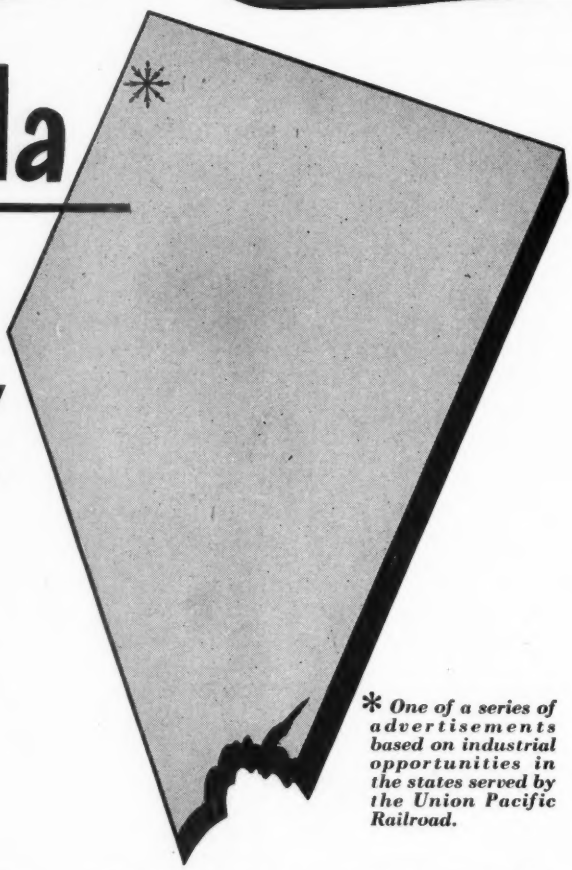
TREASURE MAP OF INDUSTRY

Nevada



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- *Colorful scenic attractions*
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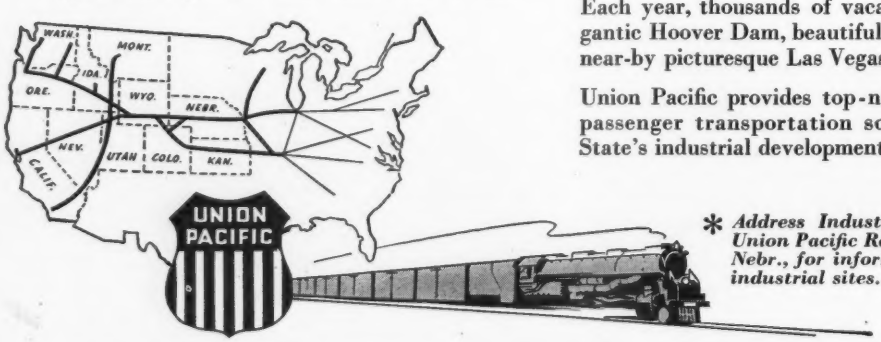

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UNION PACIFIC RAILROAD

THE STRATEGIC MIDDLE ROUTE

hydraulic pump which furnishes power to the drawworks hydraulic brakes and a separated D.C. driven pump furnishes power to the throttle controls. Intermittent operation is required in the 5 H.P. motors which extend the derrick legs and the 10 H.P. motor mounted in the subbase which drives the hydraulic ram and chute motors. Alternating current is normally used for rig lighting, although direct current can be used equally well.

An independent blower unit, located at a distance from the well, provides cool gas-free air to both the drawworks motor and the rotary table motor. The blower units are powered by a 3 H.P. and a 5 H.P. 125 Volt, direct current motors. The blower motor and an air duct, storage rack are built into a unitized package. The "Spiri-tube" air duct is interesting in that it collapses for hauling. A 23-foot section will telescope into a section less than 4 feet high.

Electronic Equipment

There are three interesting electronic devices on this rig. A Dynamatic Corp. eddy current brake is mounted on the drawworks drumshaft, and the wide range of braking control obtained from this unit together with the safety features of air clutches remove any danger of failure or improper adjustment of the remote controlled drawworks brakes.

A second Dynamatic Corp. eddy current device is used to control the rate of penetration and to regulate the weight of the bit on bottom. This electronic controlled, dynamatic coupling is located on the selective transmission trailer. The drive back from the drawworks is through the conventional driving chains and through the electric motor into a 20.4 to 1 gear increaser, which gives an over-all reduction of 1,000 to 1 between the drumshaft and dynamatic coupling. The dynamatic coupling is mounted on the output of the gear increaser, and by controlling the intensity of current in the coupling, it is practical to control the rate of feed-off or the torque on the drumshaft which controls the weight carried on the bit.

An Ethco electronic weight indicator is also used. This device reads the hook load through an electric strain gauge located in the traveling block clevis. The gauge picks up its indication of weight from the elongation of the gauge. This strain indication is transmitted by electrical cable to an electronic box located near the control panel on the selective transmission trailer. A 1,000 cycle, alternating current, full bridge system is used, and voltage can be regulated to within 2 volts over a range of from 95 to 130 volts. The power to the system is supplied from 110-115 volt—250 watt—50-60 cycle alternating rig system.

The electronic system makes it possible to read the weight indicated on a dial calibrated in equal divisions for all weights. On the indicator used on this rig 1/10-inch dial spacing equals 1 ton hook load. The load indicated by this gauge is independent of the number of lines strung or the size of line, as it is a direct reading of the hook load.

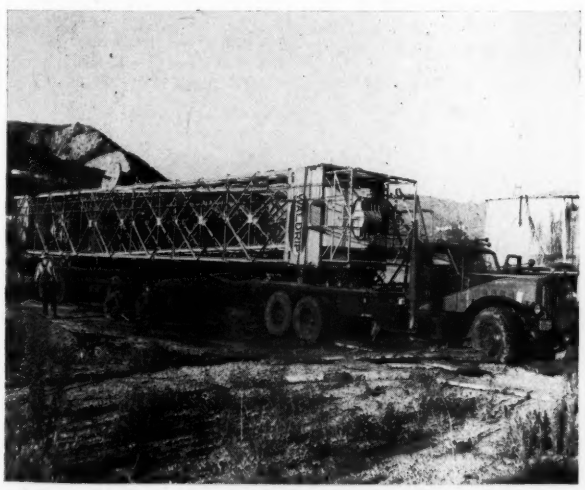
Slush Pumps and Mud System

Two slush pumps are provided with this rig. A 7¼" x 12" triplex pump is mounted on one trailer with the 400 H.P. motor and a 7¾" x 16" pump is mounted on another trailer with the 250 H.P. motor. The entire slush pump drives are permanently mounted on their own trailer. In fact, the frame of the triplex pump is an integral portion of the frame of the trailer. The units are assembled so the pump, motor, and V-belt drives, and guards are legal in respect to width.

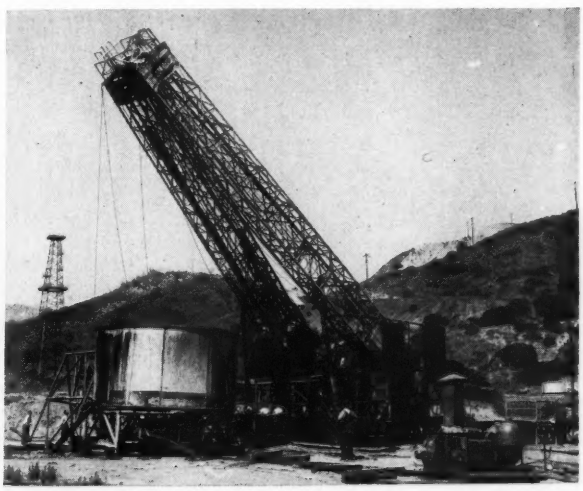
Connections from the pump to the mud suction tank and from the pump discharge to the mud manifolding system are through quick acting couplings. The suction line contains an offset connection, sliding tank section, and Dresser coupling. The discharge lines contain ball joints. This construction allows the drilling crew between 6 and 8 inches misalignment in three directions between the pump trailer and the mud tank.

Both pumps have flooded suctions and a suction line less than two feet in length. The mud tank unit included dual manifolding of

(Continued on Page 48)



The derrick with the block strung is compacted into this single 8' x 8' x 63' unit for legal moves over the highways.



When telescoped for moving, this new 18 ton portable oil derrick folds neatly onto a large truck bed and trailer.

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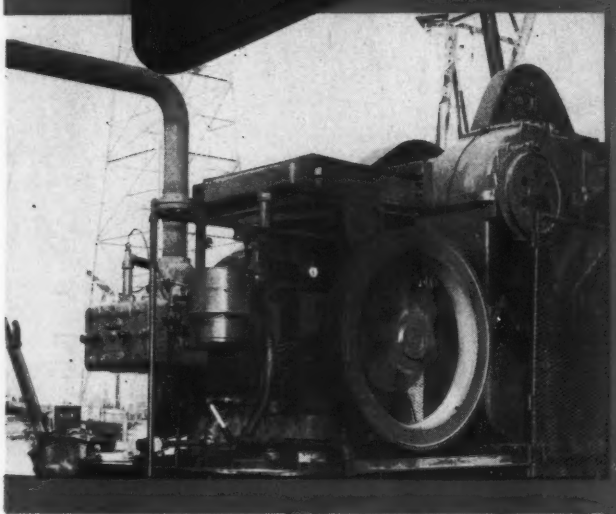

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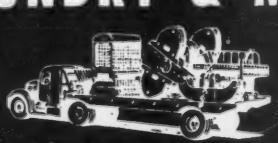

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Development of Air Fractionated Charcoal Test Method and Procedure

By
C. D. Gard and T. F. G. Boyd

December Meeting

The determination of the liquid contents and other component parts of natural gases have, over the past several years, received the attention of technical organizations, research engineers, laboratory technicians, and process operators. Perhaps no single subject related to the natural gasoline industry has received more attention. Those of us having long standing association with this industry have seen the development and use of many test methods for the determination, singly or in the aggregate, of the component parts of natural gases and the liquids extracted therefrom. In review, some of these have been the compression test method, mineral seal oil test method in its many forms, low temperature fractional analysis, mass spectrometer, infra-red spectrometer, the several charcoal test methods developed over the many years, and others not so well known.

All of these test methods have served their purpose and fulfilled certain needs, some more specifically than others. The authors, in this paper, disclose a modification of the C.N.G.A. 30-33 charcoal test procedure which has been developed to indicate to a rather accurate degree, the isobutane and heavier content of natural gases.

The gasoline absorbed by the charcoal during the saturation procedure of the C.N.G.A. 30-33 charcoal test contains virtually all of the pentanes and heavier that entered the charcoal tube, most but not all of the normal and iso-butane, a considerable quantity of the propane, and small percentages of the ethane and methane. When this charcoal is distilled in the laboratory not all of the butanes and heavier are condensed into the liquid from which the 30-33 yield is calculated. However, the quantity of butanes and heavier which is lost in these two operations is roughly offset by the quantity of propane and lighter which is retained in the 30-33 condensate, and therefore, the 30-33 yield bears some relationship to the iso-butane and heavier content of the gas tested.

In some cases a much greater loss of butanes and heavier is indicated than in others and likewise when certain types of gases are tested, a greater percentage of the propane and lighter is retained in the condensate than when other types are tested. These variations result in a 30-33 charcoal test yield which is lower than the iso-butane and heavier content of some types of gases, and a yield as much as 12% or higher than that of other types of gases. *See Table No. 1.*

The air fractionation modification of the test has been developed in order to obtain a yield and will more accurately indicate the iso-butane and heavier content of all gases tested which from this viewpoint will place all types of gases on a comparable basis.

The development of this modification was made possible by an interpretation of the charcoal adsorption phenomena gained by the authors in the early 30's during the development of a test to determine the iso-pentane and heavier content of gas by the charcoal method.

In order to understand the development of the Air Fractionated test, it will be necessary to review briefly this conception of adsorption phenomena which involves a generalization of the molecular theory of gases, the surface tension of liquids and the adhesion of liquids to solids.

Most of the energy which can be easily associated with molecules in the gaseous state can be shown to be of the two fundamental forms, kenetic and potential.

Kenetic energy is associated with motion and is represented by the formula

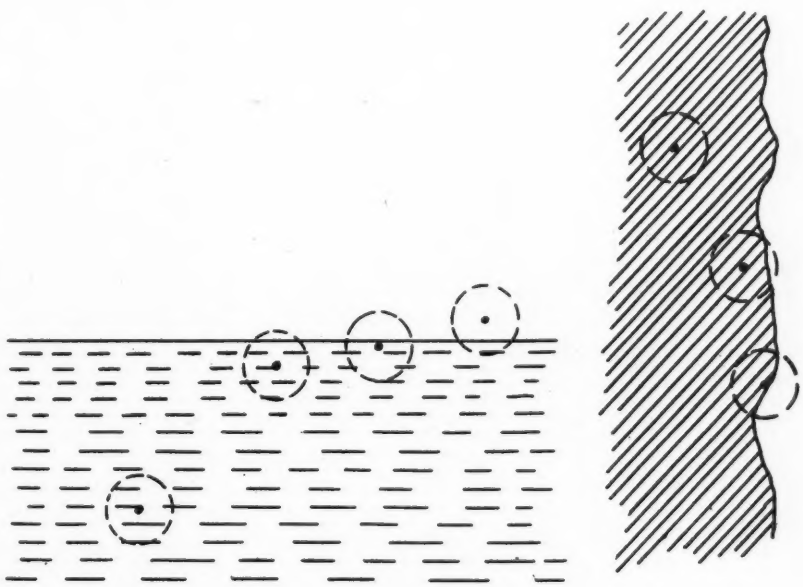

Figure 1

TABLE NO. I

DATA SHOWING RELATIONSHIP BETWEEN THE 30-33 CHARCOAL TEST YIELD AND THE iC_{4+} CONTENT OF THE GAS BY FRACTIONAL ANALYSIS

SAMPLE	A	B	C
Approx. Source Pressure	2#	6" Vac.	73#
MOL. %			
H_2O	2.90	3.90	0.60
Air+CO_2	1.10	1.70	0.20
C_1	75.08	74.73	85.66
C_2	7.31	7.37	5.68
C_3	5.66	5.24	3.96
iC_4	1.47	1.35	1.02
nC_4	2.17	1.93	1.39
iC_{5+}	4.31	3.78	1.49
Total	100.00	100.00	100.00
GALS./MCF			
of C_3	1.550	1.435	1.082
of iC_4	0.479	0.440	0.331
of nC_4	0.683	0.607	0.437
of C_{5+}	1.732	1.474	0.593
of nC_{4+}	2.415	2.081	1.030
of iC_{4+}	2.894	2.521	1.361
CHARCOAL TEST – G/MCF			
30-33	2.73	2.57	1.53
RATIOS			
C_3 to C_4	1.55	1.60	1.64
C_4 to iC_{5+}	0.85	0.87	1.61
PERCENT CHARCOAL 30-33 YIELD OF iC_{4+} BY ANALYSIS			
	94.6	102.0	112.5

$$K E = \tfrac{1}{2} M V^2$$

where M = mass of molecule
V = velocity of molecule

Potential energy is energy by reason of position and is represented by the formula

$$P E = m g h$$

where m = mass of molecule
g = gravitational acceleration between molecules
h = distance between molecules

Gravitational force is represented by the formula

$$F = \frac{{}^{m}1 \quad {}^{m}2}{d^2}$$

where ${}^{m}1$ = mass of one molecule
${}^{m}2$ = mass of another molecule
d = distance molecules are apart

Although the above formula appear to be simple, they can become very involved when applied to the actual mechanics of molecular action and therefore, a detailed discussion of this subject is beyond the scope of this paper. However, in order to visualize the mechanics of adsorption, it is necessary to have a knowledge of certain generalizations derived from these formulae.

In this regard, it can be seen that kenetic energy varies directly as the square of the velocity for any particular molecule, that for molecules having the same kenetic energy, the relative velocity varies inversely as the square root of their mass, that potential energy varies directly as the distance the molecules are apart, that gravitational force varies directly as the mass of the molecule, that momentum varies directly as the square root of the mass, and that the forces associated with kenetic energy affect the molecules of a gas in the opposite direction to the forces associated with potential energy, or in other words, are opposing forces. The momentum generated in the molecule by kenetic energy tends to force the molecules apart and the gravitational force of the potential energy tends to pull them together.

Such phenomena as temperature pressure, critical states, vapor pressure, adhesion, cohesion, surface tension, etc., can easily be traced to this interaction. It is thought that this interaction between molecules is also responsible for the phenomena of adsorption of gases by activated charcoal and that this phenomena is simply a special case of the action which takes place between molecules at the interphase of any gas and any solid.

A molecule in the body of a solid may be regarded as being affected by all the molecules within its sphere of action and an attraction in one direction is balanced by an equal attraction in the opposite direction. This is not true of a molecule in or near the surface of the solid. All the particles within the sphere of action pull it back toward the body of the solid and there is no balancing force to pull it outward except the relatively very few gas molecules which were close enough to the surface of the solid to be within its sphere of action. These gas molecules would have very little total gravitational pull because of being so thinly dispersed; however, they themselves would be acted upon by the unbalanced force of the concentrated surface molecules of the solid. See Figure No. 1. This force would tend to pull the gas molecules to the surface of the solid, and as the distance between the gas and solid molecules would then be extremely small, the attractive forces would be relatively very great and hold the gas molecules on the solid surface. As this action continues, the gas molecules build up on the solid surface in the liquid state. See Figure No. 2. As the liquid film built up, the distance between the molecules in the surface of the liquid and the molecules in the surface of the solid would become greater and greater, and therefore, the effect of the unbalanced force less and less until the combined effect of the unbalanced force of the solid molecules and the surface tension of the liquid would not be sufficient to offset the kenetic energy of the gas molecules and no more liquid would be condensed on the solid. A state of dynamic equilibrium would then exist between the gas and the liquid surface. The surface of the liquid would always be under the combined tension of the unbalanced force of the solid molecule and the unbalanced force of the liquid molecules. The entire body of the liquid would be under a tension or compulsion to shrink caused by the unbalanced force of the molecules in or near the surface of the solids.

From the foregoing, it can be seen that the molecules in the liquid film which are first adsorbed and are nearest to the solid surface are held more tightly than molecules at the surface of this film, in fact, there would be a gravitational force gradient through the film starting at the surface of the film and increasing until the maximum was reached at the surface of the solid. This force would increase inversely as a power of the distance between the liquid molecules and the surface of the solid. We know that this power must be greater than a square because the gravitational formula alone indicates an inverse square, and in addition, the liquid molecules pick up the spheres of action of more and more solid molecules as they approach the solid surface.

Molecules in a liquid state have less potential energy than when in a gaseous state, and molecules in a liquid state which have been compelled to shrink also lose potential energy because they have changed their position as regards each other and are closer together. The probable channel of outlet for this energy dissipation when adsorption takes place can be visualized in the following manner; molecules entering the sphere of the unbalanced force of the solid surface are increased in kenetic energy and upon impact with the solid surface dissipate part of this energy into the body of the solid, that is, the gas molecules entering the sphere of action of the unbalanced force become heated and dissipate this heat into the cooler solid body. According to this conception, the first layer of gas molecules adsorbed would become hotter and, therefore, dissipate more energy than successive additional layers and an energy dissipation gradient would exist through the liquid film. The first liquid adsorbed and in direct contact with the solid surface would have lost the most energy and the liquid at the surface of the liquid film and in contact with the gas would have lost the least energy. This gradient would also vary indirectly as a power of the distance the liquid molecules were removed from the solid surface when adsorbed. The liquid film being in contact with a solid surface should also

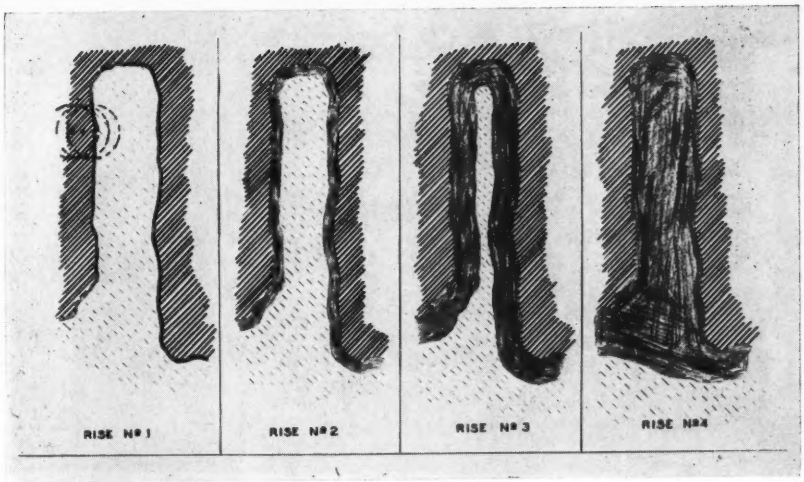

Figure 2

be governed by all the known laws which apply in such a state; that is, adhesion, cohesion, heats of wetting, etc.

Of course, the liquid film adsorbed on a solid surface from gas molecules would be extremely thin because the sphere of action of any molecule is extremely small, and, therefore, the unbalanced attractive force of the surface molecules of any solid would disappear completely at a very short distance beyond the surface of the solid.

There may be, and probably are, other factors that control the thickness of the liquid film, but the following factors are more or less obvious:

(1) The mass and concentration of the solid molecules which are measured by the actual specific gravity of the solid.
(2) The mass or weight of the gas molecules.
(3) The kenetic energy of the gas molecules which is proportional to the temperatuure.
(4) The concentration of the gas molecules which varies directly with the pressure.
(5) The concentration of the gas molecules which are in the liquid film. This depends upon the liquid equivalent of the gas.
(6) The contour of the solid surface.

From the above it can be seen that if we consider the adsorption of a gas on some specific solid substance, all other things being equal, the higher the molecular weight of the gas molecule, the thicker the adsorbed liquid film must be. This is primarily because the gravitational force is proportional to the mass and the ratio of momentum to mass lowers as the mass increases. It also can be seen that the higher the existing temperature the thinner the film must be and the lower the existing presure, the thinner the film must be as this increases the ratio of momentum to mass. It is also true that a gas whose molecules are less concentrated when in the liquid phase should produce a slightly thinner_film upon adsorption.

The volume of the liquid adsorbed depends, of course, upon the thickness of the liquid film and the area of the solid surface upon which it is adsorbed. The volume of gas adsorbed depends on the volume of liquid adsorbed and upon the gas to liquid equivalent of the gas.

Activate charcoal granules are penetrated by a network of very small pores or cells which present a very large intra-granular surface area to gases which enter these pores. The contour of the surface of the pores being curved holds a thicker film of liquid than a similar flat surface would hold. This is because any point on the surface of a liquid film held by a concaved solid surface will come within the sphere of action of more solid molecules than if the surface of the solid were flat. See Figure No. 3.

The liquid film formed by the gas on the surface of the charcoal pore is nevertheless very thin, but

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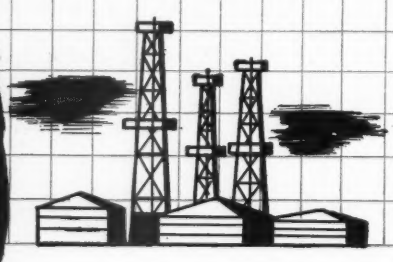

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the enormous surface area exposed enables the charcoal to hold a considerable **volume** of liquid.

There are two definite phases of charcoal activation. The first may be termed "Surface Area Activation," the degree of which can be defined as, "The intragranular volume of the pore space per unit volume of bulk charcoal." The second is, "Volumetric Activation", the degree of which can be defined as "The intragranular volume of the pore space per unit volume of bulk charcoal." The ratio of the first or "Surface Area Activation" to the second or "Volumetric Activation" is inversely a function of the average pore diameter, smaller pores giving a higher ratio than larger pores. The activation of charcoal as a whole is a function of the number of pores or cells divided by this ratio, that is, the greater the number of pores and the larger the pores, the more active the charcoal will be.

When a pure hydrocarbon gas is adsorbed in activated charcoal, the molecules of the gas form a thin layer of liquid over the intragranular surface of the pores. Whether the liquid layer completely fills the pores or not depends upon the thickness of the liquid layer and the diameter of the pores. In this regard, it is known that when methane is adsorbed on an average 50 minute activated cocoanut shell charcoal at atmospheric pressure and 80°F., approximately 7 cc of methane gas at standard conditions is adsorbed in 1 cc of bulk charcoal and that the pore space in the charcoal is not completely filled with liquid methane. It is evident that the pore space is not completely filled with liquid because the same volume of bulk charcoal, under the same adsorbing conditions would have adsorbed approximately 85 cc of propane gas at standard conditions. This 85 cc of propane gas when converted to its liquid equivalent equals 0.31 ml of liquid propane which completely fills the pore space of the 1 cc of bulk charcoal. This 0.31 ml volume of the pore space in the charcoal can be checked approximately by obtaining the specific gravity of the charcoal granules and comparing it with that of pure carbon. It also can be calculated that if pure ethane gas were adsorbed in this charcoal under the same conditions 0.31 ml of ethane liquid would be condensed in the charcoal and completely fill the pore space.

From the above, it can be seen that with regard to the saturation of activated charcoal with a gas, at some standard temperature and pressure, if the liquefied gas does not completely fill the pore space, the "Surface Area Activation" is the controlling factor, but if the liquefied gas does completely fill the pore space, the "Volumetric Activation" is the controlling factor. Such gases as hydrogen, nitrogen, oxygen, and methane fall in the class which do not completely fill the pore space of the charcoal and, therefore, the adsorption of such gases is a function of surface area. Gases such as ammonia, propane, butane, etc. fall in the class which do completely fill the pore spaces and, therefore, the adsorption of these gases is a function of the pore volume or intragranular void space of the charcoal.

The gas in contact with the adsorbed liquid in the charcoal granules is in a state of dynamic equilibrium with the liquid. This equilibrium can be calculated fairly closely by Raoult's Law, if a constant for each gas is derived by dividing the vapor pressure of the gas in the liquid state by its molecular weight, this constant being substituted for the vapor pressure of the gas in the pure liquid in the equilibrium calculations.

Fractionation and Temperature Rise Phenomena: When natural gas is passed through activated charcoal as in the sampling procedure of the charcoal test, due to the high percentages of methane in the gas, surface area adsorption is the controlling factor. Equilibrium conditions are reached very rapidly because of the large surface area with which the adsorbed liquid contacts the gas and fractionation of the various components of the gas is facilitated by the effect of molecular weight as one of the controlling factors in equilibrium. When the first gas passes into the bottom of the charcoal tube, only a few inches of charcoal are required to fractionate out all the heavier components from the methane. As the saturation of the charcoal proceeds and increasing quantities of gas are passed into the bottom of the tube, pure methane passes up through the tube progressively saturating the charcoal in the upper sections and finally passes out the top. When the pure methane has reached the point in the tube where it is saturating the charcoal around the thermometer bulb the first temperature rise of the test is indicated. At this point the charcoal has reached a maximum saturation with methane, a lesser degree of

TABLE NO. II

COMPARISON OF AIR FRACTIONATED TEST YIELD WITH FRACTIONAL ANALYSIS AND 30-33 CHARCOAL TEST YIELDS

SAMPLE	D	E	F	G	H	I	J
			MOL. %				
H_2O	0.00	0.10	0.50	0.20	1.90	1.80	2.80
Air+CO_2	7.11	1.30	1.50	0.40	1.20	1.70	0.80
C_1	14.11	72.68	76.41	89.25	75.99	74.44	68.68
C_2	7.58	10.37	9.17	5.61	7.67	8.21	8.96
C_3	19.70	10.68	7.21	2.83	6.10	6.32	8.39
iC_4	6.97	1.37	1.16	0.44	1.17	1.24	1.84
nC_4	16.06	2.11	1.97	0.72	2.10	2.26	3.02
iC_{5+}	28.47	1.39	2.08	0.55	3.87	4.03	5.51
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.0$_0$
			G.P.M.				
Frac. Analysis iC_{4+}	18.395	1.636	1.807	0.573	2.636	2.759	3.755
Unrectified Air Fractionated Test	18.49	1.630	1.819	0.569	2.618	2.795	3.730
30-33 Charcoal Test	.....	1.873	1.978	0.645	2.711	2.878	3.807
			RATIOS				
C_3 to C_4	0.86	3.08	2.31	2.44	1.86	1.81	1.73
C_4 to iC_{5+}	0.81	2.51	1.55	2.11	0.85	0.87	0.88
			% OF FRACTIONAL ANALYSIS iC_{4+}				
Unrectified Air Fractionated Test	100.52	99.63	100.66	99.30	99.32	101.30	99.33
30-33 Charcoal Test	.....	114.49	109.46	112.57	102.85	104.31	101.38

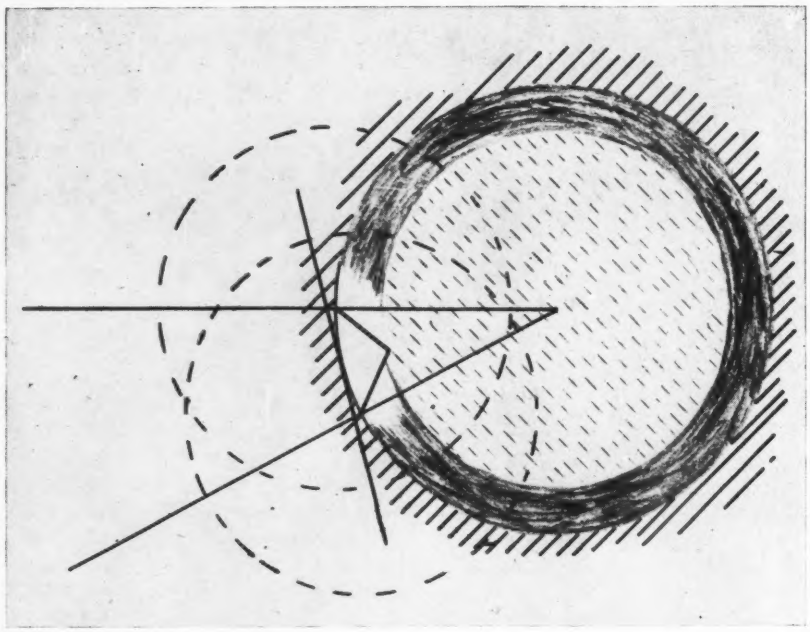

Figure 3

saturation with ethane, a still lesser degree with propane and so forth. As more gas is passed into the charcoal tube, the ethane and heavier components which have been separated out from the methane by fractionation build up in the charcoal in the bottom of the tube and as they build up the heavier components are fractionated out from the ethane. The ethane thus released from the heavier components of the mixture passes up the tube with the methane, reaches the top and finally passes out of the tube. When the ethane reaches the point where it is saturating the charcoal around the thermometer bulb, the second temperature rise of the test is indicated. At this point the charcoal in the tube has reached its maximum saturation with ethane. Likewise, the third rise indicates the maximum saturation of the charcoal with propane and the fourth with butanes. All of this action is taking place at the same time and all the saturation points or rises start together at the bottom of the tube when the gas starts flowing but each saturation point passes up the tube at a different velocity. The methane point being the fastest reaches the top of the tube first, the ethane point being next in velocity to the methane reaches the top second, and so forth. Iso- and normal butane having the same molecular weight are not separated sufficiently to indicate two separate temperature rises but both appear together as the fourth rise. See Figure No. 4.

Heat Released During Saturation

When a gas is adsorbed in charcoal, it changes state from a gas to a liquid. This releases the latent heat of vaporization of the gas, which together with the heat of wetting of the adsorbed liquid raises the temperature of the charcoal and its surrounding media.

During the saturation of the charcoal, the charcoal surrounding the thermometer bulb in the top of the tube is saturated successively by methane, ethane-methane mixture, propane-ethane-methane mixture and butane-propane-ethane-methane mixture. The controlling factor in the first three of these saturations is usually surface area adsorption and, therefore, the volume of liquid adsorbed increases successively and heat is released at each of these points. The fourth or butane point usually saturates the charcoal to its volumetric capacity, completely filling the pores and is indicated by a fourth release of heat. After this, no more heat can be released as the charcoal pores are completely filled with liquid and cannot adsorb any more gas. If, however, the fourth saturation did not completely fill the pores, as might be the case if the absolute pressure on the tube were very low or the temperature high, a release of heat would also be indicated at the fifth saturation point when pentane was added to the mixture in the top of the tube. If the pressure on the tube was high or the temperature low or if the methane content of the gas being sampled was low, the third saturation might completely fill the pores with liquid. In this case, there could not be any heat released after this point and the fourth temperature rise would not be indicated. In most cases this trouble can be corrected by saturating the charcoal at a sufficiently low pressure so that the pores would not be completely filled at the third rise. Then a fourth rise would appear.

The quantity of heat being released at any fractionating area (saturation point) depends partly upon the difference in the quantity of hydrocarbons being condensed and being evaporated and partly upon the thickness of the liquid film when adsorption takes place as previously mentioned. In this regard it is interesting to note that although a relatively small quantity of methane is adsorbed at the first temperature rise, the release of heat is considerable because the methane is adsorbed relatively close to the solid surface. The butanes adsorbed at the fourth rise are furthest from the solid surface of the charcoal and usually release the smallest quantity of heat. The propane rise is usually the highest due to the fact that the methane and ethane together take up but little of the capillary void space and when propane is added to the mixture the void space is almost filled, the large adsorbed volume releasing the greatest quantity of heat.

The quantity of hydrocarbons being condensed and evaporated depends in a rather complicated manner upon the composition of the gas being passed into the charcoal column. The intensity of the heat being released at the fractionating area depends upon several other factors beside the quantity of heat being released. It depends upon the rate of heat release which would be governed by the rate the gas was passed through the charcoal, upon the rate of radiation, upon the

height of charcoal in the tube required to accomplish the fractionation, and upon the design of the charcoal column.

Theory of the Air Fractionated Test

The foregoing discussion of the theory of the adsorption of the hydrocarbon vapors in the charcoal discloses how a partial separation of the higher hydrocarbons from the heavier is accomplished during saturation. It is evident that if some means could be used to further fractionate in a selected manner, it would then be possible to obtain, to a rather accurate degree, a propane-free condensate representing that content of the gas being tested. In seeking such a test, it must be remembered that in order to obtain a condensate from which an accurate iso-butane and heavier content of the gas can be calculated, it is first essential that all of the iso-butane and heavier components of the gas be retained in the charcoal during and after the saturation procedure, and, secondly, that all of the propane and lighter which is held in the saturated charcoal be separated from these iso-butane and heavier components after distillation.

Many methods of fractionating out the propane and lighter were tried and discarded either because of inaccuracies or because of complications in equipment and/or length of time involved. Some of the methods attempted include:

(1) Fractionating the 30-33 condensate by conventional refluxing methods;

(2) Reducing the pressure on the saturated charcoal tube and applying external heat to the tube, (this method was originally used successfully by the authors for obtaining an iso-pentane and heavier yield but was discarded because of the time required and equipment involved).

Having a knowledge of the mechanics of adsorption of gases by activated charcoal very much simplified the problem of developing a test which would indicate an accurate iso-butane and heavier content of natural gas. However, there were still many difficulties to be overcome in regard to keeping the apparatus and procedure practical, simple, and economical. It was felt desirable to make as few changes as possible in the present standard C.N.G.A. method or equipment as this equipment and method were already in general use. Methods also had to be worked out to accurately check test results by fractional analysis. Also, the calculation of new shrinkage factors involved considerable thought and work.

(3) Many trials were made to air fractionate without the addition of unsaturated charcoal to the top of the tube prior to the adoption of this feature.

Air as a Fractionating Medium

Air was selected for fractionating the propane and lighter out of the charcoal for the following reasons:

(1) Air is only slightly adsorbed by the charcoal.

(2) Air is only slightly absorbed by the hydrocarbon liquid held on the surface of the charcoal pores.

(3) Air lowers the partial pressures of the hydrocarbons in the adsorbed liquid fractions, thus effecting partial vaporization of these fractions which are readsorbed and revaporized many times over as they pass up the tube. As the heavier higher boiling point hydrocarbons are predominant in the adsorbed liquid and the lighter lower boiling point components are predominant in the vapors, the propane and lighter are fractionated off from the iso-butane and heavier.

(4) This procedure permits the air fractionation to be carried on in the laboratory, one operator fractionating six tubes simultaneously.

(5) By the use of air for fractionating, only one minor change in the standard charcoal distillation apparatus is required.

Method of Test

(1) In the air fractionated test the iso-butane and heavier component of the gas is completely retained by discontinuing the saturation procedure at the start of the fourth temperature rise instead of the top of this rise as is the case in the present C.N.G.A. method. This prevents any of the butane from reaching the top of the charcoal in the tube and escaping with the effluent gas.

(2) The propane and lighter components are removed from the saturated charcoal by fractionation with air. The saturated charcoal tube is prepared for fractionation by adding a quantity of unsaturated active charcoal to the top of the charcoal tube. A thermometer is inserted into the added charcoal so that the bulb is approximately one inch below the surface of the unsaturated charcoal. Air is then passed through the saturated charcoal at a predetermined rate.

(3) As the air fractionation proceeds, the lighter components are fractionated off and are readsorbed in the unsaturated charcoal at the top of the tube. Here the methane, ethane, and propane are separated from the butanes and pass out of the tube with the effluent air.

(4) As the methane, ethane, and propane are being adsorbed in the charcoal around the thermometer bulb, heat is being released and is indicated by a sharp rise on the thermometer. As the air flow is continued, equilibrium is established and this heat dissipated, the temperature returning to normal. When the butanes reach the thermometer bulb, a second release of heat is indicated and at this point of the procedure, the air fractionating is discontinued. Due to the fact that there is one inch of active charcoal above the thermometer bulb, none of the butanes is lost from the charcoal.

After air fractionation, the charcoal contains all the iso-butane and heavier components of the original gas tested and is virtually free of all the propane and lighter.

(5) The charcoal is then removed from the tube in the regular manner and may be distilled either by glycol or steam as a displacing agent. The distillation procedure is the same as the standard C.N.G.A. except that the distillation can now be completely shut in as light hydrocarbons which would normally increase the still pressure above 30 p.s.i.g. are not present in the condensing system and the pressure on the still will not exceed 30 p.s.i.g.

Apparatus and Procedure

The final development of the air fractionated test procedure differs from the tentative standard published in the C.N.G.A. Bulletin No. TS-351 in the following:

APPARATUS:

Air fractionation equipment in the laboratory includes:

These features of the cross-roller cutter design of

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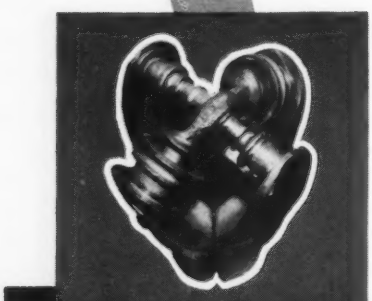

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(1) a rack to hold six saturated charcoal tubes,

(2) a vacuum header equipped with six adapter heads and six rate caps,

(3) a source of vacuum,

(4) a shut-off valve installed in the line upstream from the 30 lb. regulator in the standard distillation apparatus.

PROCEDURE:

(1) Fill the tube with approximately 220 ccs of charcoal while saturating instead of the standard 260ccs.

(2) Terminate the saturation of the tube when the temperature at the top of the tube has increased to approximately one degree F. of the fourth rise. The charcoal tube is then disconnected, sealed, and transported to the laboratory.

(3) Before distillation the saturated tube is air fractionated in the laboratory in the following manner:

(a) Fill the tube by adding approximately 40 ccs of unsaturated activated charcoal and fasten thermometer adapter in place on top of tube so that the top of the thermometer bulb is approximately one inch from the surface of the charcoal.

(b) Replace the cap on the bottom of the tube with an orifice which will pass approximately *ten cubic feet of air when the pressure in the tube is maintained at about eleven inches of Hg vacuum.

(c) Connect the outlet of the adapter to a source of approximately *eleven inches of Hg vacuum.

(d) Pass air through the charcoal tube and when the thermometer indicates the top of the butane temperature rise, disconnect the tube from the vacuum source, dismantle the adapter and orifice and reseal the tube which is now ready for distillation.

(4) During the 30#-33°F. distillation, keep the valve upstream from the 30# regulator closed. This valve has been installed for this purpose and keeps this part of the distillation shut in.

*This rate and pressure may be varied, depending upon available equipment and in order to produce good temperature rises while air fractionating.

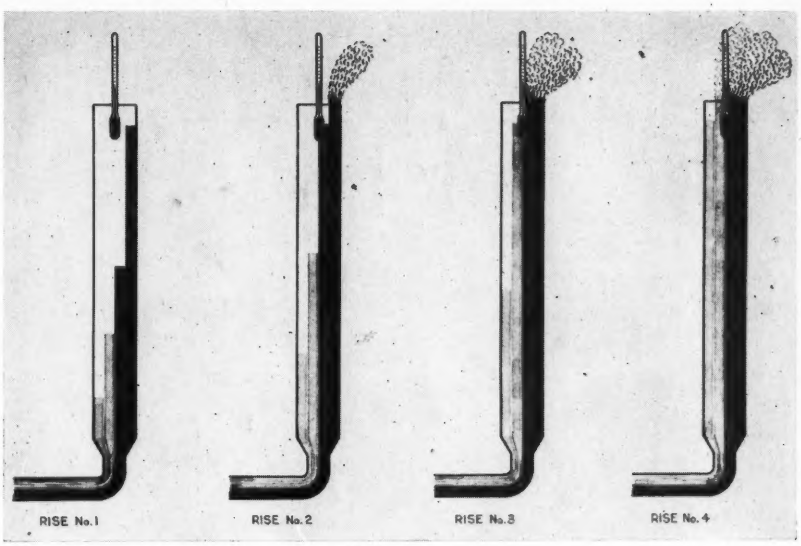


Figure 4

Calculation of Results

Since the shrinkage factors as published in the Bulletin TS-351 are based on the ccs of condensate of the 30-33 test and the rectified tests, the propane and lighter fractionated off during the air fractionating procedure would not be accounted for by these tables. An investigation of the total shrinkage involved disclosed that a constant volume of 0.025 cubic feet, representing the quantity of oxygen and nitrogen adsorbed in the charcoal prior to saturation by hydrocarbon vapor, passed from the tube during saturation. This volume appeared to be constant for the average activity of the charcoal used. It was further observed that for the air fractionated procedure the volume of the light hydrocarbons removed during the air fractionation amounted to from 0.03 to 0.04 cubic feet, and, therefore, an average figure of 0.035 was assumed to be sufficiently accurate for the purpose. These values are very low and only become significant when field saturation of the charcoal tube is accomplished with a very low corrected cubic feet of gas; such as when testing high gasoline content gas. Since the volume 0.025 is substracted from the volume of the metered gas and the volume of 0.035 is added to the metered volume of gas, the net result of these two adjustments can be accomplished by always adding a net amount of 0.01 cubic feet to the shrinkage factor supplied by the C.N.G.A. tables.

Test Data

A series of tests were conducted after development of the procedure, results of which have been tabulated in Table No. 2. This table shows the fractional analysis of the gas, the iC_{4+} yield by fractional analysis, the unrectified air fractionated charcoal test yield, the 30-33 C.N.G.A. charcoal test, the ratios of the C3-C4 content and the C4 to the iC_{5+} content by analysis, and the ratio in percent of the unrectified air fractionated test yield and the 30-33 charcoal test yield to the fractional analysis iC_{4+} yield. It will be noted that the maximum deviation of the unrectified air fractionated test from the fractional analysis iC_{4+} yield is only 1.30% and the minimum deviation only 0.70 Results obtained in field tests indicate a reproducibility within one-half of 1% may be reasonably expected.

A recent test of a gas having 12 gallons/mcf of C_3 showed a C.N.G.A. 30-33 yield of 127 of the iso-butane and heavier content by fractional analysis. The condensate from the C.N.G.A. 30-33 test showed 1.84 G/M of C_3 and the condensate from the air fractionated test showed only 0.23 G/M_3.

The rectified test as outlined in C.N.G.A. Bulletin No. TS-351 may be followed to obtain a rectified yield from the air fractionated test with no adjustment to apparatus or procedure other than those already mentioned.

Oil Well Pumping Below 8000′ Using Conventional Geared Pumping Units

This paper was delivered and the pictures taken at the November 10 Meeting of the API Coastal Chapter held at the Ventura Junior College Auditorium at Ventura, California. In addition to Mr. McConville's, a paper was given by Ward Blackburn of Vernon Tool Company on the performance of hydraulic long stroke units. John Hobkins of Kobe, spoke on his Company's "free type" pump.

By Al McConville
Lufkin Foundry & Mach. Co.

Al McConville

The long slow stroke with out a doubt has come into its own, and seems to be the answer to the maiden's prayer, also to the many wells drilling below 8000 feet.

Due to the many wells drilled in the last few years the demand for more economical methods to lift oil from greater depths, has gradually developed better pumps, stronger rods, and more powerful surface equipment.

The patience and cooperation shown by the oil companies have enable the pumping unit manufacturers to come up with a machine that is easily understood, economical, and once installed you can walk away from it and do not have to look back.

Structurally long stroke geared units are sound and designed to subject the new 1-⅛" sucker rod to its ultimate allowable working stress and to withstand a peak polished rod load of 40,000 pounds.

When long stroke pumping units were first designed a gear of 268,000 in. lb. of torque was assumed to be sufficient but units were soon found to be underpowered and gears of 400,000 and 500,000 pounds were installed. As wells were drilled deeper and strokes were lengthened torque was increased to 850,000 in. lbs. and at least two well known unit manufacturers have plans for the use of 1,000,000 in. lb. gears.

Before going into definite examples, let us first discuss its limitations. There would be no need for a long stroke unit on a well to handle 200 barrels from 7000 feet and no need for it to handle 500 barrels from 3500 feet. For wells below 8000 feet or for many shallower wells with large fluid production there is a definite need for the unit that will operate economically at long slow strokes reducing rod loading and minimize rod fatigue.

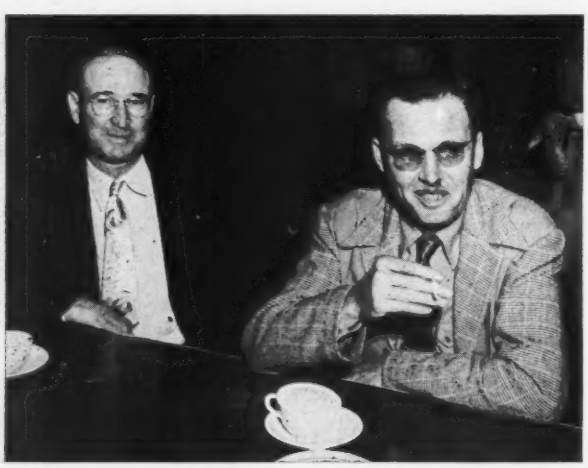
To illustrate what can be done with, and what can be expected of, the conventional geared pumping unit, I would like to present the following calculations on pumping below 8000 feet.

First let us take a look at the problem of pumping 200 barrels a day from a well 8000 feet deep using a 1½" bore pump, 144" stroke unit at 7 strokes per minute, the recommended rod string is as follows:

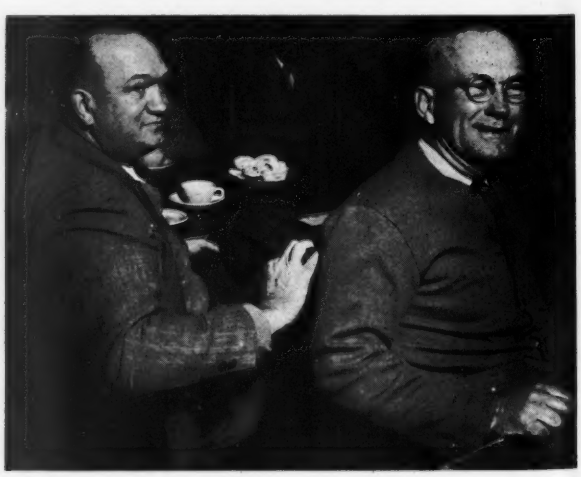
21% ..... 1" Rods
24½% ..... ⅞" Rods
54% ..... ¾" Rods
Acceleration factor ..1.1
Peak Polished
rod load .....22.150 lbs.
Max. Rod Stress....28,200 lbs. per sq. in.
Net plunger travel ...114"
rod load .....22.150 lbs.
Net plunger travel ...114"
Production .....220 bbls. per day

Calculated set up for **10,000′ well, 1-1/16" pump,** 144" polished rod travel and 7 S.P.M.
Recommended rod string:

18% ..... 1" Rods
20% ..... ⅞" Rods
62% ..... ¾" Rods



M. E. (Pop) Norris, Richfield Coastal Supt., Homer McQuillan, Richfield Production Engineer.



F. R. (Dutch) Schmieder, Division Mgr., Shell Oil Co., Ventura. George Elliott, Well puller, Shell Oil Co., Ventura.

T. H. "Buck" Rogers, Engineer, C. C. M. O. Co., Ventura; Ben Turner, Pet. Engineer, Lloyd Corp., Ventura.

Bob Kettenberg, Div. Engr., Shell Oil Co., Inc., Ventura; Al McConville, representing Lufkin Foundry & Machine Co., Los Angeles.

Static load.....21,400 lbs.
Acceleration factor 1.1
Polish rod load .....23,540 lbs.
Rod stress .....29,600 PSI
Plunger travel .....130"
Production .....120 bbls. per day

You will note that the maximum rod stress shown in the preceding examples is well within the rod stress limits of 30,000 PSI, due to low acceleration. Motion could be increased some here if fluid was available and still be within the recommended stress limits of the rod.

Calculated example of well 10,000 feet deep, **300 barrels of production a day with 1¼" pump,** 11½ 144" strokes. Tapered rod string as follows:

15% ..... 1-⅛" Rods
17% ..... 1" Rods
18% ..... ⅞" Rods
50% ..... ¾" Rods
Static load .....25,500#
Acceleration factor...1.27
Polished rod load.....31,700#
Maximum rod stress..31,900 lb. per sq. in.
Plunger travel.....146"
Production .....300 bbls.

We have a well **10,000' deep production 300 barrels with 1½" bore pumps,** 15 120" SPM.

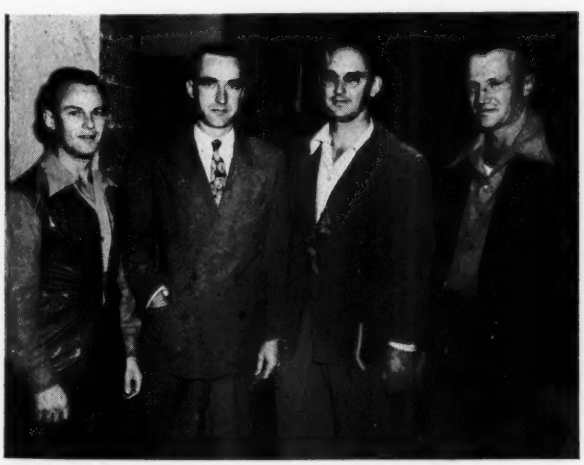
Recommended rod string:
15% ..... 1-⅛" Rods
17% ..... 1" Rods
18% ..... ⅞" Rods
50% ..... ¾" Rods
(Rod set up & loads same as previous example)
Static load.....25,500#
Acceleration factor.....1.29
Polished Rod load.....32,100#
Maximum rod stress.....32,300 PSI
Net plunger travel.....125"
Production .....300 B.P.D.

While there is a polished rod travel of 120" due to acceleration, there is 125" plunger travel assuming tubing is anchored. Although it is the rod manufacturers recommendation not to exceed a rod stress of 30,000# per square inch, the two preceding examples are somewhat in excess of 30,000#, but dynamometer tests made on heavy pumping wells reveal that satisfactory results are being obtained where rod stresses sometimes range in excess of 35,000 P.S.I.

When low load ranges are present and other conditions are favorable, rod stresses up to 38,000 P.S.I. have been reported to perform satisfactorily.

With the geared unit it is easy

(Continued on Page 48)



Norman Slick, Prod. Engr., Tide Water Associated Oil Co., Ventura; Vic Fawcett, Lufkin Foundry & Machine Co., Los Angeles; Boyne Grainger, Dist. Prod. Engr., Tide Water Associated Oil Co., Ventura; Bob Spaulding, Lufkin Foundry & Machine Co., Los Angeles.

R. L. "Bob" Jackson, Supt., The Texas Co., Santa Paula; R. L. 'Pat" Patton, Dev. Engr., The Texas Co., Santa Paula.

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2. **SIMULTANEOUS FIRING** under all conditions gives exact spacing of shots, perfect perforation pattern, and saves down-the-hole time.
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5. **GUNS TO FIT EVERY CONDITION.** McCullough employs more than 30 different types and sizes of guns.
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Personalities IN THE NEWS

Minckler Elected President of General Petroleum

R. L. Minckler has been elected president of the General Petroleum Corporation, succeeding, on January 1, S. J. Dickey, who is retiring, it was announced Dec. 29 at the company's home office in Los Angeles. R. A. Sperry, senior vice-president and a director of the concern, also will retire on that date.

Mr. Minckler was elected a G. P. vice-president in 1945, upon returning from wartime service as Director of Petroleum Supply of the Petroleum Administration for War. In June of this year he was advanced to the position of executive vice-president. During the past year, he was one of the three western oil men appointed by Secretary of the Interior Krug to the government's 15-man Military Petroleum Advisory Committee, whose function is to advise the Army and Navy on petroleum matters. He was also recently elected a member of the National Industrial Conference Board.

Born in Minneapolis, Mr. Minckler's first job was that of oil boy with the Great Northern Railway. He served in the Army during the first World War and subsequently attended the University of Washington, majoring in business administration. He then became a purser for a trans-Pacific steamship line and, in 1921, came to Southern California to work for the Southern California Edison Company as a cost accountant. He joined General Petroleum in 1924; became assistant to the president 10 years later and in 1941 was elected a director. He was for several years a director of the Kettleman North Dome Association.

Mr. and Mrs. Minckler, whose home is in Glendale, Calif., have two children, Barbara, 17, a freshman at the University of Colorado, and Robert, 15, a sophomore at Glendale High School. Mr. Minckler is a member of the California Club.

R. L. Minckler

Mr. Dickey, whom he succeeds, has been president of General Petroleum since 1941. He first joined the company in 1919, after broad engineering experience following his graduation from the University of Pennsylvania in 1904. He progressed rapidly in the concern, being made chief engineer in 1920, a director in 1927 and vice-president in charge of manufacture in 1930.

During the first World War, Mr. Dickey was appointed by the Army to direct the development of processes, design and installation of two major plants on the Pacific Coast to produce toluene for the production of T.N.T. This work resulted in the first commercial scale production of nitration-grade toluene from petroleum and solved an explosive shortage situation developing in this country at that time.

Mr. Sperry is one of the pioneers of General Petroleum and the oil industry, having started work in the Kern River fields in 1901. He joined General Petroleum in 1912, becoming a director in 1925, and a vice-president in 1926.

J. G. Jordan, marketing vice president of Shell Oil Company, Incorporated, announced today that E. R. Raphael, Southern California Division Manager will take charge of the company's Advertising and Sales Promotion Department on January 1. He replaces R. D. Stetson, whose appointment to Operations Manager was announced recently.

P. C. Thomas, St. Louis Division Manager for Shell, will succeed Raphael as head of the Southern California Division.

Brigadier General Daniel H. Hudelson, assistant superintendent of stores for General Petroleum, has been appointed commanding general of the 40th Infantry of the California National Guard. He succeeds Major General Harcourt Hervey, who is retiring. General Hudelson during the late war was active in the European battle front. He was awarded the Silver Star, French Croix de Guerre and Moroccan Order of Goums.

Robert Lutton, who recently rounded out 30 years service with General Petroleum, joined the company as roustabout in November, 1917. He has always been with the production department in the San Joaquin division and at present is head well puller at North Midway.

Vacationers during recent weeks in the Mammoth Lake country were Al Foss, southern division engineer, and J. A. Hardesty, home office engineer, Signal Oil & Gas Co. They were in the Sierras during the first snowfall of the year.

Neil Norris, Jr., Joins Bell & Burden

Bell & Burden, Inc., drilling contractors, announced the appointment of Mr. Neil J. Norris, Jr. as General Superintendent of field operations, effective December 1, 1947.

Neil Norris, Jr.

Mr. Norris comes to Bell & Burden, Inc., with a fine background of experience and oil field traditions in the contracting field and his father is well known in California as a successful oil executive and drilling contractor.

Neil Norris, Jr. was born in the heart of the San Joaquin oil fields and has had experience as driller, foreman and superintendent in all areas of California. He was until recently connected with Loffland Bros., Inc. one of California's oldest and most successful contracting firms.

Mr. Norris graduated in Business Administration from University of Southern California and during the war he served as intelligence officer in the Army Air Forces.

Negotiations are in progress for sale of an interest in the pro grid Los Angeles Rams to Edwin W. and Harold Pauley of the Petrol Corp. Edwin Pauley is a graduate of the University of California and now serves on the board of regents. He played tackle for the Golden Bears until he suffered a broken neck in an airplane crash and had to give up the gridiron game.

C. R. Musgrave and D. M. McBride of Phillips Petroleum Co. in Bartlesville, Okla., were the recent Los Angeles guests of Don Gilman of Western Oil and Gas Association. The Oklahoma oil men while in Southern California conferred with business associates and visited friends.

J. T. Van Rensselaer of the Southern Counties Gas Co.'s paper took first place for the best feature story in an award of merit contest sponsored by the Southern California chapter of the International Council of Industrial Editors.

Russ Havenstrite, widely known oil producer and president of the newly formed Beverly Hills Polo Club, says the top polo players of the world will perform in the Los Angeles area this winter. The games will be held at the old Riviera Country Club, to be known in the future as the Beverly Hills Polo Grounds.

George Murray, public relations chief for Tide Water Associated at Los Angeles, has returned to his desk after a sojourn and a suntan at the desert resort at Twenty-nine Palms.

Robert T. Harcus was a principal speaker at the meeting of the junior section of the Pacific petroleum chapter, American Institute of Mining and Metallurgical Engineers at the Rio Hondo Country Club. His subject was "Application of the Shaped Charged Process to Petroleum Production."

H. H. (Bob) Roberts, in charge of public relations for California Standard in the City of the Angels, was a recent business visitor to San Francisco.

"A crisis fostered by poisoned emotions confronts America's free enterprise system." That was the gist of an address by Rush M. Blodget of the Oil Producers Agency before the Oregon Transport Industry meeting at Portland, Ore.

Atkinson Advances at G. P.

T. A. Atkinson, for the past three years assistant superintendent of the southern division of General Petroleum's production department, has been named assistant manager of the company's industrial relations department, it was announced by A. J. Donnelly, the concern's manager of industrial relations.

T. A. Atkinson

Mr. Atkinson, the son of an oil man, began his career with G. P. by working summers from 1926 to 1931. He joined the company in 1935 as a well puller and has occupied various positions in the production department. He is a graduate of Compton High School and the University of California at Berkeley where he received his B.S. degree.

Mr. Atkinson is a member of several American Petroleum Institute committees, including the Pacific Coast District Committee of Standardization of Rotary Drilling Equipment; member and past chairman of the California District Topical Committee on Materials and a member of the California District Topical Committee on Drilling Practice. He is also chairman of the Southern California Section of the American Institute of Mining and Metallurgical Engineers.

Mr Atkinson makes his home at 1009 So. Fifth Street in Alhambra. He has four children, three boys and a girl.

Rogers E. Lacy, 63, who lived long enough to see a $350 sweet potato patch bloom into a $50,000,000 oil fortune, died of a heart attack at his home in Longview, Tex.

T. A. Atkinson, for the past three years assistant superintendent of General Petroleum Co.'s southern division production department, has been named assistant manager of the company's industrial relations branch.

Husky steel workers who ran up the new General Petroleum Building at Sixth and Flower Streets in Los Angeles in record time, were tendered a congratulatory noon-day dinner on the grounds of the Police Academy by C. S. Beesemyer, vice president of General.

The Committee for Economic Sanity in Government is the name of a new organization at Midland, Tex., headed by John A. McDermott, general manager of Intercoast Petroleum Co. The Texas oil man is well known on the Pacific Coast.

Professor Raymond C. Moore, University of Kansas, spoke on "Problems of Sedimentary Facies" at the meeting of the Pacific Coast section, American Association of Petroleum Geologists, at the Clark Hotel in Los Angeles.

R. T. Scriven is the new Texaco agent at the bulk plant in Santa Rosa. He formerly was stationed at the Oakland bulk plant.

Members of the trade and daily press were treated to a superlative luncheon at the Shell Club at Ventura Avenue, following the demonstration of Shell's new portable electric rig. MC was Oscar Shove of public relations. Shell's J. B. (Boake) Morris had everybody humming with a tinkling tune on the ivories.

LeBow & McNee on its own account is drilling an important wildcat test near the Fruitvale field. The hole is down 3800 ft. and being whipped northward.

The California chapter of the American Association of Oilwell Drilling Contractors decided to skip the regular monthly meeting in December. They were out, however, in full force at the Christmas Jinks of the Wildcat Committee of the Western Oil and Gas Association.

Santa Fe Drilling Co. is on another contract for Union Oil Co. at Long Beach. It is L. B. Comm. No. 28.

Three Billions Oil Investment in California

The California oil industry represents an investment of private capital aggregating $3,000,000,000, it was announced recently by the Western Oil and Gas Association.

This investment, according to Don E. Gilman, association executive vice-president, embraces 25,000 producing oil wells, 52 operating refineries, several thousand miles of oil pipelines, some 20,000 service stations and numerous other facilities situated in California.

The oil industry has 106,000 persons in its direct employ but when members of their families, as well as employees of service and supply businesses, are taken into account the industry grants livelihood to over half a million persons in California.

In the calendar year 1945 oil industry employees were paid $320,000,000 in salaries and wages. Currently this figure is much higher because of several wage advances which have been effected since that time.

For the same year, the value of the products produced by the industry, as represented by its gross revenue, amounted to slightly over $1,000,000,000. While motor vehicle fuel constituted the largest single item, more than 3,000 different types of petroleum products were manufactured.

In the Pacific Coast States which constitute the industry's principal domestic market, California companies in 1945 paid $205,000,000 in Federal, State and local taxes, exclusive of Federal income taxes. Part of this burden fell directly on the companies and partly on the products which they sell. For 1946, similar tax payments are estimated at $237,000,000.

In commenting on these statistics which were compiled under the direction of the Association's Statistical Committee, Mr. Gilman observed that the industry's investment is spread over 1,000 oil companies and operators and 17,000 retail distributors. In the aggregate this investment amounts to approximately $30,000 per employee.

West Newport Still Active

Republic Operators Inc. has placed on the pump Newland No. 4 in Sec. 12-6s-11w in the Atha area at West Newport. Initial output from the lower Bolsa zone was 135 barrels of 17-4 gravity oil in 15 hrs. Total depth is 3466 ft. with plug at 2652 ft. Location has been made for No. 5 well in the section.

In Sec. 7-6s-10w, Amerada Petroleum is preparing to complete Irvine No. 57-7 from two zones between 5417-5428 ft. and 5506-5514 ft. Original bottom is 5550 ft. and plugged back depth 5520 ft. Fred B. Donnelly and Julia B. McGee are about to spud No. 1 test in Sec. 28-6s-10w. Hiawatha Exploration is planning two more drilling jobs for the Atha area to start after the turn of the year.

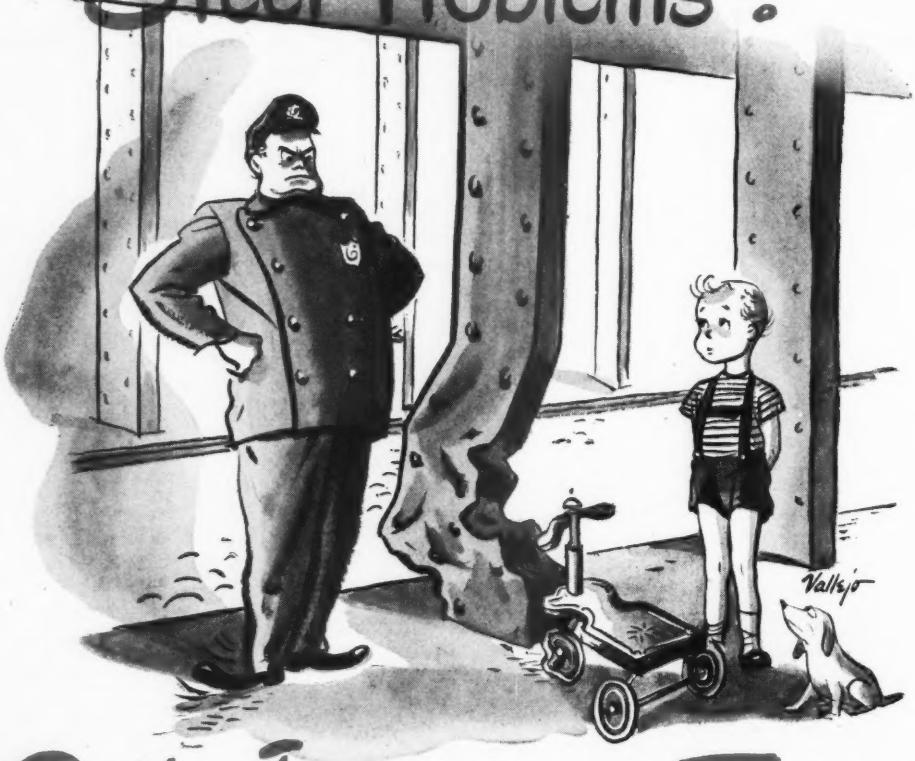
The Southern California Meter Association is in possession of a paper, "The Cutler-Hammer Recording Calorimeter," by Blake O. Cossey of the Southern California Gas Company.

This paper outlines installation requirements, maintenance, various methods of calibration, and also presents adaptations of this instrument and auxiliary equipment which will increase its value to the user.

The paper gives considerable detail with many illustrations, making its publication somewhat expensive. The Association, therefore, would like assurance of 100 advance orders at $1.25 per copy to members, $1.50 to non-members, before publication.

Orders may be placed with the Southern California Meter Association, 2916 Eucalyptus Avenue, Long Beach 6, California.

Steel Problems?



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Field Development

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Los Angeles Basin

Del Valle Test Rigging Derrick

About one-half mile north of the Del Valle field, British-American Oil Prod. Co. is rigging up to begin drilling Kinler-Southern California Petroleum No. 1 in Sec. 16-4n-17w. Village Comm. No. 1 is testing water shut off on 7-in. casing cemented at 9206 ft. Hole is bottomed at 9926 ft., with top oil sand at 9216 ft. Derrick is in Sec. 22-3s-14w.

Castaic Try Idle

L. R. Wilhite and Claude Kavanaugh's joint wildcat test in the Castaic area is idle at 585 ft. The project, known as Wilhite-Jenkins No. 1, is in Sec. 18-5n-16w.

Richfield Test Listed

A new test well for the Richfield area is planned by Zuni Oil Co. on the Soderberg lease along Richfield road north of Mariposa street. President of the company is Dan Wesley Gilbert. Vice President is P. E. Harbrecht. Universal Consolidated's C. & T. No. 1 in Sec. 5-4s-9w is making hole below 4250 ft. In Sec. 33-3s-9w, Basin Oil is drilling at 4700 ft. with Collins-Wilson Comm. No. 1.

Whittier Test Awaiting Pipe

With bare hole bottomed at 8405 ft. Livingston Drilling & Dev. Co.'s Dewey No. 1 in Sec. 1-3s-11w in the East Whittier area is awaiting casing.

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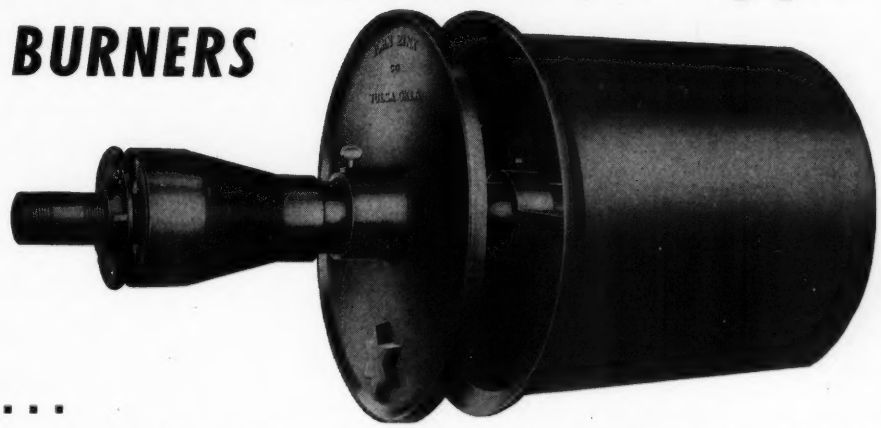

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Lawndale Project Grading Drill Site

Seaboard Oil Co. is grading drill site for Pauley-Seaboard No. 81-20 in Sec. 20-3s-14w in the Lawndale area. No. 51-20 was given up the other day at 6004 ft., after fish was recovered to 3770 ft.

Chino Hills Try Drilling

In the Chino area, Chino Hills Oil Co. is digging at 820 ft. with Chino Hills No. KB-4 in Sec. 33-2s-8w, San Bernardino County. A little oil was found in the aera by Mahala Oil in 1920.

Inglewood Well Drills

Basin Oil's Inglewood Comm. No. 3-1 in Sec. 28-2s-14w in the Inglewood area is drilling at 7339 ft. The company has a number of additional drilling jobs scheduled for the district.

Newhall Try Drills

Drilling at 4982 ft. is the latest report from Mutual Development Corp.'s Sanborn No. 1 wildcat test in Sec. 6-3n-16w. Bankline Oil has rig up for Newhall Corp. No. 1 in Sec. 31-4n-16w.

Dominguez Project Digs

Morton and Sons' Dominguez Estate No. 1 southerly extension test of the Dominguez field is drilling below 5200 ft. Drill site is in Sec. 3-4s-13w. El Toro No. 14-1 in Sec. 14-6s-8w is digging on down at 5323 ft.

Beach Well Shows Gas

Near the corner of Golden West avenue and Schleicher road in Sec. 34-5s-11w in the Huntington Beach field, Seguro Petroleum Co. is drilling ahead at 5880 ft. in shale showing quantity gas in cores. The project is searching for showings found by the Rex venture, which despite its promising appearance was never completed, due to a series of mechanical troubles. Success of the Seguro well would redound to the benefit of several large companies, including, Union, Standard, Texas and Holly.

Johnston Stainless Welding Rods

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Los Angeles Well To Pump

Richfield is rigging to pump its Vail No. 3 in Sec. 16-2s-12w in the East Los Angeles area. Total depth is 9200 ft. Vail No. 4 in Sec. 9 is rigging up. U.S. Rubber No. 1 in Sec. 16-2s-12w is drilling below 8350 ft. E. W. Pauley's Pacific Tube-Stewart No. 1 in Sec. 9-2s-12w is a location.

Santa Ana Test Rigs

In the Santa Ana Gardens area, Tide Water Associated has rig up for Martin No. 1 wildcat in Sec. 21-5s-10w, Orange County. It is about 1½ miles southwest of Santa Ana.

Palos Verdes Wildcat Works

Having successfully recovered fish, Lesco Oil Corp. is now preparing to straighten hole in Sepulveda No. 1 in Sec. 22-5s-14w in the Palos Verdes area. The hole has been plugged back from 705 ft. to 600 ft. for the straightening move.

Long Beach Area Drilling Lively

Los Nietos Co.'s townlot well in the Belmont Heights area at East Long Beach has foundation in. It is called East L. B. Comm. No. 1 and is in Sec. 33-4s-12w. More than 4900 leases are involved in the drilling block. General Petroleum's I. P.C. No. 4 in Sec. 29-4s-12w, shooting for the deep zone uncovered by Shell, is standing cemented with 7-in. pipe set on bottom at 10,455 ft. Pacific Western's Hilton & Stanton No. 1 in Sec. 29-4s-12w is drilling at 9730 ft. Shut off at 9706 ft. was okay. Shell is digging at 8719 ft. with Alamitos No. 49-A in Sec. 29-4s-12w. Bixby Fee No. 1 and Hart Comm. No. 1 in the section are making hole at 8630 and 9350 ft., respectively. Union Oil's L. B. Comm. No. 28 in Sec. 30 is trying to regain circulation. Present depth is 2719 ft.

Happy New Year to All Our Readers

San Joaquin Valley

Gould Hills Try Located

Still a location is Atlas Production Co.'s wildcat test in Sec. 33-27s-19e in the Gould Hills area, Kern County.

Santiago Try Sidetracking

Western Gulf is ready to sidetrack drill pipe fish from 2200 ft. in its U. S. Case-Comm. No. 1 in Sec. 23-11n-23w in the Santiago area.

Priest Valley Wildcat Drills

Approximately 5 miles west of production established at Coalinga, J. Walter Van Atta & Associates is prospecting ahead below 1350 ft. with Van Atta No. 1 in Priest Valley. Drill site is in Sec. 20-20s-13e, Fresno County.

Raisin City Well Flowing

Flowing a reported 250 barrels a day, D. H. Graham & Associates has completed at 5241 ft. its No. 2 well in Sec. 18-15s-18e in the Raisin City area, Fresno County.

Arvin Test Drills Ahead

British-American Oil Prod. and Capital Co. continue to explore ahead at 6276 ft. with Arvin Comm. No. A-47 in Sec. 26-31s-29e in the Arvin area.

Strand Test Oil Failure

Beloil Corp., Ltd., has abandoned its KCL-B No. A-1 in Sec. 18-30s-26e at 8340 ft. The "W" point was reached at 7911 ft. and the Stevens topped at 8209 ft.

Kettleman Hills Project Fishing

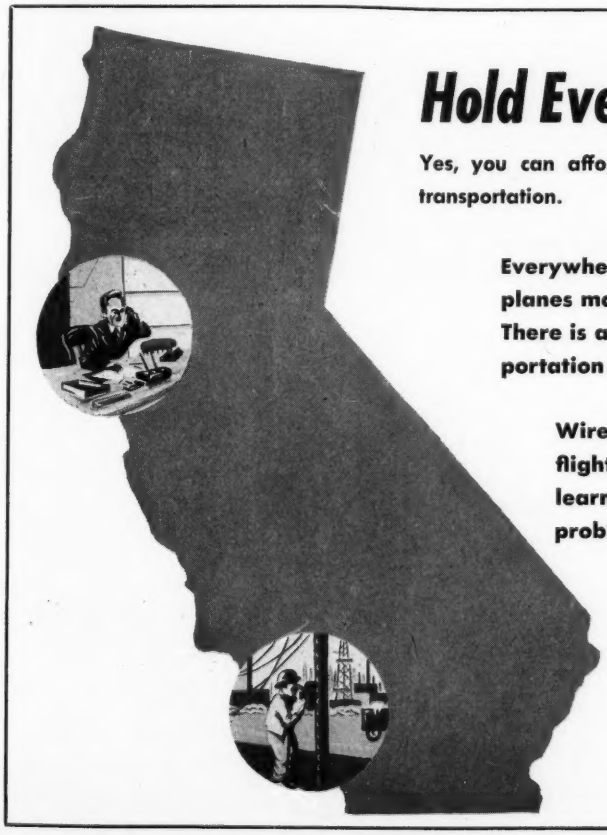
Standard of California's steady journey toward old bottom at 12,389 ft. with its redrill of No. 73-30V in Sec. 30-23s-19e in the Middle Dome area of Kettleman Hills has been interrupted by a fishing job. Redrilled depth is 12,177 ft. with drill collar and bit in the hole. S. F. & F. L. No. 4-2 in Sec. 12-25s-19e in the South Dome area is digging below 9150 ft.

In the Arvin area, Tupman No. 2 in Sec. 22-31s-29e is making hole at 3157 ft. Southeast of the Jacalitos field, Ferguson No. 21-6N in Sec. 6-22s-16e has been given up at 7525 ft. The Santa Margarita at this location was topped at 5162 ft., Kreyenhayen at 6053 ft., Eocene sand at 7222 ft., and Cretaceous at 7471 ft.

No. 55-1Y in Sec. 1-30s-21e near McKittrick is reaming, with bottom at 1783 ft. Semitropic Unit No. 1-1 in Sec. 5-27s-23e in the Semitropic area on formation test of 4204 ft. and present depth of 4400 ft., flowed at the rate of 200,000 cubic ft. daily. The hole is now being reamed.

Fruitvale Test Probable Pumper

LeBow and McNee Oil Co. is preparing to pump its KCL-A1 in Sec.



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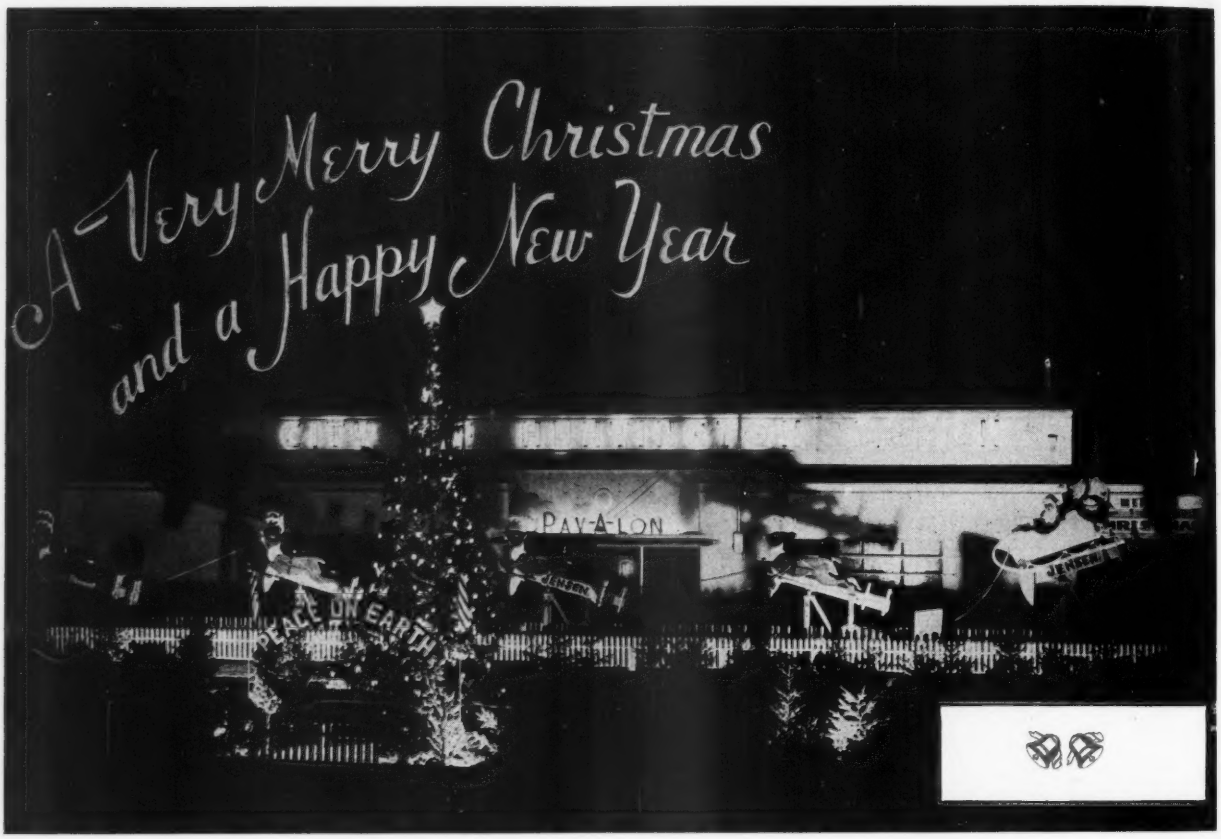

TO YOU ALL

The Oil Tool Corporation
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34-29s-27e near the Fruitvale field. Hole is down 4111 ft. in oil sand, with casing cemented at 4003 ft. Dougherty No. 88-14, a test sponsored by Superior Oil Co., is drilling at 2216ft.

North Belridge Test Abandoned

A recent abandonment is Belrdige Oil Co.'s No. 63-30 in Sec. 30-27s-20e in the North Belridge area. Total depth is 4227 ft. No. 65-30 in the section is coring at 905 ft.

Kern Well Spudded In

Approximately 600 ft. northeast of KCL China No. 1, E. Jorgensen has spudded and is drilling ahead at 825 ft. with No. 2 in Sec. 9-28s-28e in the Kern River field. No .1 was completed at a plugged depth of 1375 ft. for an initial yield of 20 barrels daily, cutting 30 per cent. St. Anthony Oil Corp., meantime, has abandoned its test well in Sec. 18. The drill found granite at 5602 ft. and quit at a total depth of 5657 ft. Standard of California has programmed 8 wells in Sec. 5.

Blackwell Test Starts

Location for Beer No. B-4 has been staked by Hamilton & Sherman in Sec. 17-26s-19e in the Blackwell's Corner area. The hole is primarily designed to gather geological information.

Comanche Pt. Test Spudded

Gene Reid Exploration Co. last was reported drilling ahead at 560 ft. with Gould No. 2 in Sec. 33-12n-18w, Comanche Point. Richfield Oil's S. P. No. 10 in Sec. 25-12n-19w is drilling at 4920 ft.

Round Mountain Wildcat Barren

Loren L. Hillman's first well in a campaign of development south of the Round Mountain field has been abandoned at 2780 ft. in grad sand. Tagged Bowhay-Portals No. 1, the well is located in Sec. 5-29s-29e.

Mountain View Project Fishing

Fishing drill pipe still holds the attention of Pacific Western P. H. Greer No. 53 in Sec. 9-31s-29e in the Mountain View wildcat area. The venture on test some weeks ago showed enough oil to encourage eventual commercial success.

Bacon Hills Test Coring

Spot coring below 6750 ft. describes the present operational stage in Seaboard Oil's No. 26-21 test well in Sec. 21-28s-20e. In the nearby McDonald Anticline area, Independent Exploration is making hole at 4955 ft. with Theta No. 62 in Sec. 20.

Raisin City Well Planned

Padre Oil Co. has been organized for the prime purpose of drilling a well in Sec. 19-15s-18e in the Raisin City area. It will be a contract job. Harry C. Long is president of the company, and Don Long, secretary.

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Coastal and Northern District

Colusa Wildcat Repairing Rig

Having pulled in rig while preparing to spud, Honolulu Oil Corp. is repairing rig on its Honolulu-Barnsdall Unit No. 1 in Sec. 23-15n-1w in the Meridian area, Colusa County.

Chico Well Starts Down

Superior Oil Co., which recently completed its Towne No. 1 in the Chico area of Butte County, has spudded and is drilling ahead at 1558 ft. with its second test there. The current undertaking is Elkhorn No. 1 in Sec. 33-21n-1e. The Towne well is in Sec. 18-20n-1e.

Bardsdale Try Starts

West of the South Mountain field, Cleveland Oil Co. has location staked for Elkins No. 3 in Sec. 6-3n-19w. The objective will be the Sespe.

Four Deer Area Adds New Producer

With completion of its No. 5 well in Sec. 4-8n-33w in the Four Deer field, which it discovered some months ago, Sunray Oil has now five producers there. The No. 5 was finished at a plugged depth of 4700 ft. pumping at the rate of 150 barrels of 35 gravity oil daily. Los Flores No. 6 is drilling ahead in surface formations. No. 4 is a foundation.

San Ardo Well Pumps

Texas Co.'s Rosenberg No. 1 in Sec. 27-22s-10e in the San Ardo area in Monterey County, Salinas Valley, has been completed and at last reports was pumping at the rate of 35 barrels daily. Original bottom is 2378 ft., with hole plugged back to 2100 ft. Rosenberg No. 2 in the section is digging ahead at 1863 ft.

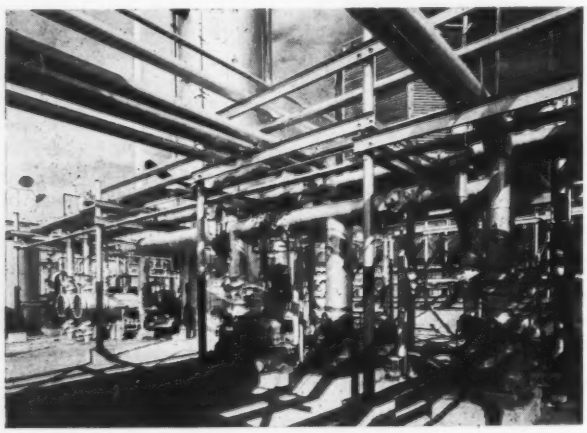
Drilling of Rosenberg No. 1 followed completion of the Lombardi No. 1 discovery well, which came in from a finished depth of 2158 ft.

Texaco's success marked the end of an extensive oil hunt in the great Salinas Valley, which history indicates started 38 years ago with a wildcat sponsored by the old Consolidated Oil Co. in Sec. 26-24-10.

While the discovery well and the followup job failed to find oil in quantity, they did serve in proving the existence of petroleum in hitherto unproductive Monterey County. Texas Co. has a block of between 75,000 and 80,000 acres under lease. Other important holders in the San Ardo area include Honolulu, Chanslor-Canfield Midway, Bishop, Jergins and North American Consolidated. Leasing near King City continues at a brisk rate.

Santa Paula Test Working

Dip-meter is being run in T. W. Gibson's Portillo No. 1 in Sec. 26-



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ARMCO

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CALCO DIVISION, 2614 Seventh Street, Berkeley 2, Calif.
423 LeRoy Street, Los Angeles 12, Calif.

4n-21w in the Santa Paula area of Ventura County. Hole is bottomed at 3000 ft.

Ojai Venture Nears Finish

In the Ojai area of Ventura County, Richfield Oil is about to complete its Ojai No. 50 in Sec. 13-4n-22w. Total depth is 3842 ft., with casing set at 1825 ft.

Oxnard Try Quits

Signal Petroleum Co. of Calif., Ltd. has abandoned its Schumate No. 1 in Sec. 28-2n-21w in the Oxnard area, after reperforating the intervals of 1250-1280 ft. and 1370-1380 ft. and bailing all fresh water.

Saticoy Try Deep

Drilling is going ahead at a depth of 11,695 ft. in Superior Oil's Saticoy No. 1 wildcat test in Sec. 10-2n-22w in the Saticoy area, Ventura County.

Arroyo Grande Adds Location

Adams Oil Co. has location staked for Dollie No. 9 in Sec. 6-32s-13e in the Arroyo Grande field, San Luis Obispo County. Tiber Oil Co., meantime, has finished at 1025 ft. its Machado No. 5 in Sec. 31-31s-13e, pumping 20 barrels a day.

South Mountain Project Starts

Foundation is in for R. E. Havenstrite's Price No. 1 exploratory venture in Sec. 19-3n-20w in the South Mountain area of Ventura County.

Montalvo Well Flows

Standard of California has given the finishing touches to its McGrath No. 65-3 in Sec. 30-2n-22w across the river from the discovery well in the Montalvo area. Initial flow from a redrilled depth of 9860 ft. was 55 barrels of 30.7 gravity oil along with 250,000 cubic ft. of gas daily. Maxwell No. 1 in Sec. 23-2n-23w is drilling ahead at 16,447 ft., after running electric log to 16,238 ft. Texas Co. has abandoned at 12,051 ft. its J. V. No. 1 in Sec. 24-2n-23w. Richfield's Del Cielo No. 1 in Sec. 30-2n-22w would not flow and is rigging to pump. Bottom is 10,400 ft. Lloyd Corp.'s No. 1 in Sec. 23-2n-23w is a rig only.

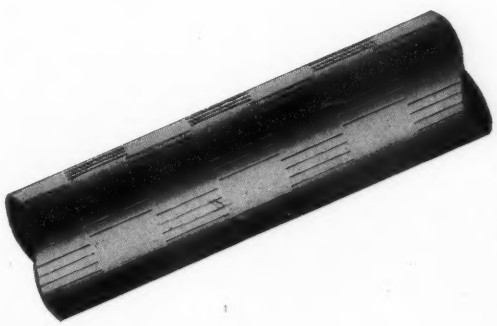
Templeton Try Oil Failure

Fred Miller and Richard R. Nance have pulled out of their Cherry No. 1 in Sec. 18-27s-11e in the Templeton area of San Luis Obispo County. The bottom of the hole is in Cretaceous at 1002 ft. This formation was topped around 800 ft. Location falls on the famed and historic Rancho Paso Robles.

The anti-trust division of the Department of Justice has advised attorneys for the Sunray Oil Corp. that the Federal department has decided that at this time it will not file suit to enjoin the proposed merger of Pacific Western and Mission Corp. into Sunray.

MORE

Clean Fluid In The Hole



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Pacific's Fine-gauge Slotted Pipe—slots range from 15 to 30 thousandths of an inch in width—keeps the sand from entering the hole. The sand forms a bridge over the slots and permits the fluid to enter the hole easily. In some wells where the sand is particularly heavy, Pacific Fine-Gauge Slotted Pipe performs like a gravel pack liner. In fact some users buy it for that purpose. Pacific Fine-Gauge Slotted Pipe eliminates large water strings, costly under reaming jobs and fluid scouring action and minimizes mud and silt plugging. Call on Pacific for better results where sand conditions prevail.

Pacific is also set up to cut the "Ventura Tool Flush Joint Thread" on wash-over pipe; clean out strings and casing. A.P.I. "round" and "V" threads will also be cut to your requirements.

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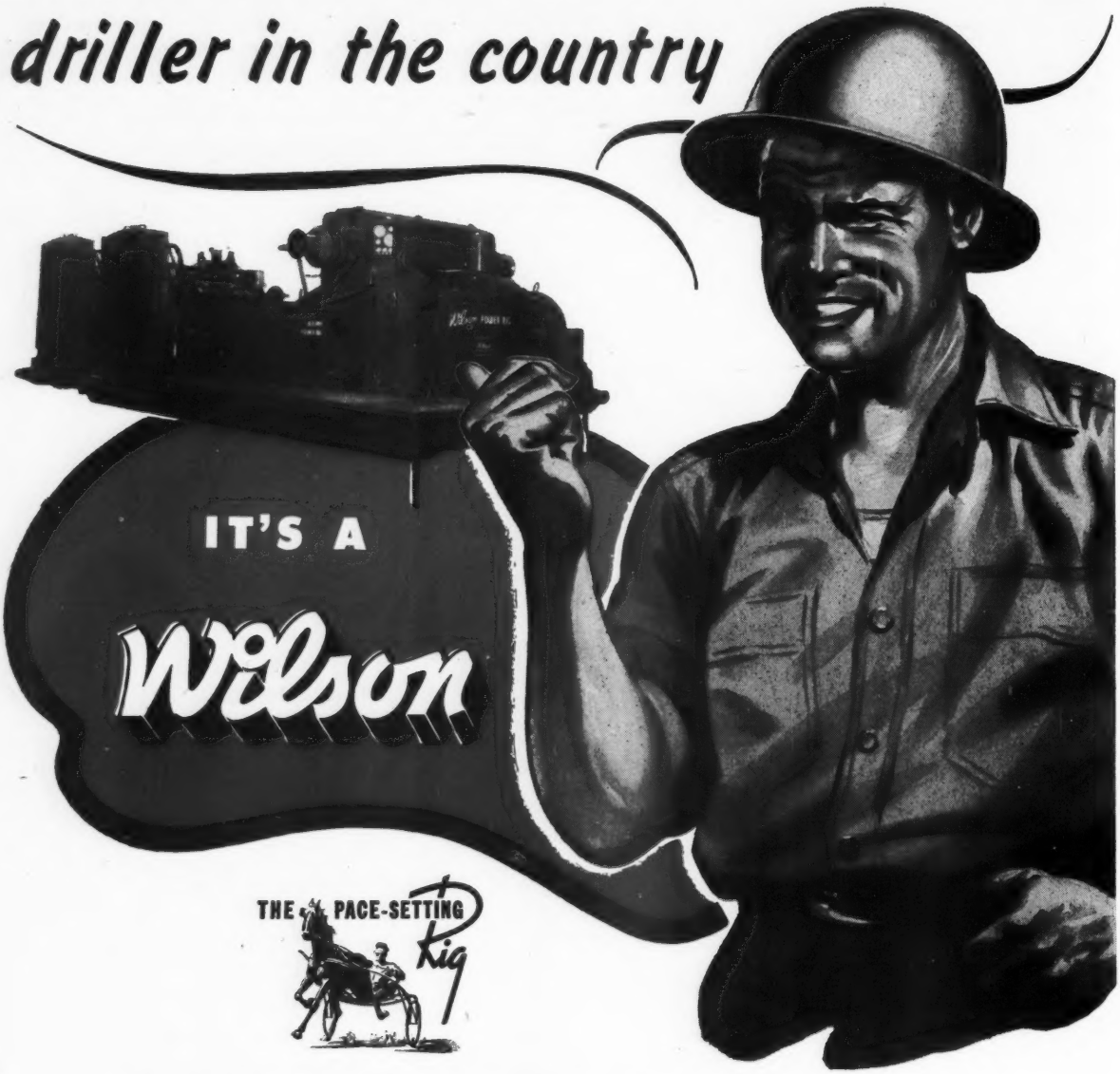

A good driller is one who can do an outstanding job in the shortest possible time... you can bet that he's using a Wilson! Here is a rig that will deliver steady and dependable power. A trouble-free rig that will not cut your profits with frequent costly breakdowns. It's no wonder that Wilson is always first choice with top-flight drillers.

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With Drilling Contractors

California operators up to December 6 had filed 1976 notices with the state to drill new wells. This compared with 1725 during the like 1946 period. Indications are that notices for the entire 1947 year will run nearly 300 more than the total last year.

The American Association of Oilwell Drilling Contractors has reported that drilling operations throughout the United States continue at a record rate. Only the scarcity of casing and other tubular goods is preventing an even greater surge of drilling activities everywhere oil is produced.

At present it looks as if 1948 will be a year of extended wildcatting and development of every possible suitable location in proved areas, the association said. More than 2000 rotary rigs are running in this country and Canada. The unprecedented oil demand assures much drilling in the year ahead.

Pacific American Oil Co. has the contract to drill O'Meara and Rogers Construction Co.'s Timor No. 1 in the Huntington Beach field. The contractor on Seguro Petroleum Co.'s interesting test on the Old Union Copeland lease is Severns Drilling Co.

Hoyt Drilling Co. will drill Amerada Petroleum Corp.'s Farnsworth No. 37-7 at West Newport. The contractor is completing Amerada's No. 57-7.

Contract for drilling Cleveland Oil Co.'s Elkins No. 3 in the Bardsdale field has been let to William Thornbury.

Cowart & Dix Drilling Co. of Bellflower, which is primarily engaged in water well drilling, is prepared to conduct test drilling to depths approximately 1000 ft.

Plans have been drawn to extend the mud training program of the American Association of Oilwell Drilling Contractors to California.

Classes will be held in both the Los Angeles Basin and Bakersfield area. The program probably will be conducted through the extension training division of the University of California. It will be designed to cover mud problems current in California.

These mud schools first came into existence in the Mid-Continent area through the aid of the University of Texas. They have trained to date about 2000 men in practical mud control.

Rocky Mountain Drilling Co. is nearing the 16,500-ft. level with Standard of California's Maxwell No. 1 deep test in the Montalvo area of Ventura County.

Santa Maria Drilling Co., Ray Norris and Ed Simonis, has been awarded contract by General Petroleum to drill Fullerton No. 1 in the Cat Canyon field.

Coast Line Drilling Co. has the contract to drill S. F. No. 7 for Wilshire Oil Co. in the Santa Fe Springs field.

Dan Dunlap and Doug Graham will drill on contract for Shell Oil Co. Rindge No. 25 in the Inglewood field.

Apex Petroleum Co.'s Los Lobos No. 2 in the San Emigdio area will drill under contract to J. M. Jackson, Inc.

Gene Reid Drilling Co. of Bakersfield has entered into contractual arrangements with Universal Consolidated for the drilling of No. 29 in the Kern Bluff area.

K. L. Kellogg & Sons has spudded Continental Oil Co.'s interesting wildcat test known as British-American-Dodds-Thomas Unit No. 1 in the Temblor area, San Luis Obispo County.

General Drilling Co. is the contractor on Los Nietos Co. and Lucy Smith Battson's No. 6 at West Mountain.

Brown Drilling Co. of Long Beach, headed by E. C. (Ned) Brown, has the contract on Texaco's Welch No. H-8 and No. H-9 in the Rio Vista gas field. In addition to more than a half dozen rigs working in California, Brown has several going in Saudi Arabia.

E. Jorgensen's KCL China No. 2 in the Kern River field is a contract job with Central Valley Drilling Co.

T. P. Pike Drilling Co. has the contract for Jergins Oil's No. 34, No. 35 and No. 36 in the Long Beach field.

Crissman Drilling Co. has been let contract to drill Porter Sesnon and Associates's Thomas No. 1 in the Huntington Beach field.

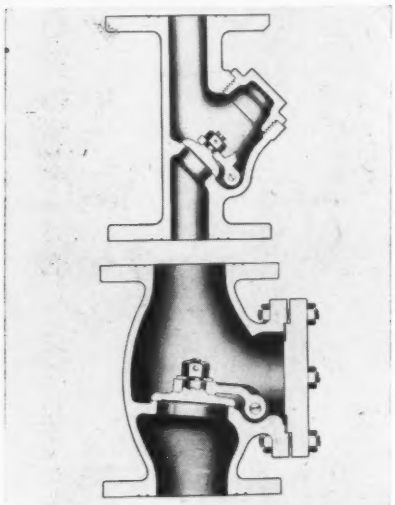
In the San Miguelito field, Bell & Burden, contractor, has rigs up for Continental Oil's Grubb No. 52-2 and No. 57.

T. & T. Oil Co., contract driller, has a rig assigned to Volunteer Petroleum Corp. for Junior No. 1 at South Mountain.

Gene Reid Drilling Co. got a new producer for Quartette Oil Co. at Huntington Beach. The well, No. 3, went to 2247 ft. for production.

Crane Co. Introduces New Line of Swing Check Valves

Crane Co., 836 S. Michigan Ave., Chicago, has introduced new lines of corrosion-resistant swing-check valves in sizes ½ inch to 6 inches. These valves, made in both 18-8 Mo alloy steel and Monel metal, are available in sizes ½ to 2 inches with screwed or flanged ends, and in sizes 2½, 3, 4 and 6 inches with flanged ends only.



In the sizes ½- to 2-inch, the body is made in a Y-pattern, and the cap is on the same center line as the seat opening. The large cap-opening gives access to the internal parts when the cap is removed, so that seating surfaces can be reground without taking the valve body from the line. A slot in the end of the disc spud permits rotating the disc with a screwdriver.

In the 2½-, 3-, 4- and 6-inch sizes, the body is the straightway type, with the seat face at only a slight angle from vertical. This design permits full straightway flow, with a minimum of flow resistance and pressure drop. In these sizes the cap is bolted to the body. The seat in these valves is cast as a part of the body, and the face is accurately machined to assure pressure-tight seating of the disc.

When so ordered, the 2½- to 6-inch valves can be furnished with outside lever and weight, which can be applied either to assist the disc in closing, making the valve extremely sensitive to reversal of flow, or to balance the disc, causing the valve to open under a minimum of pressure.

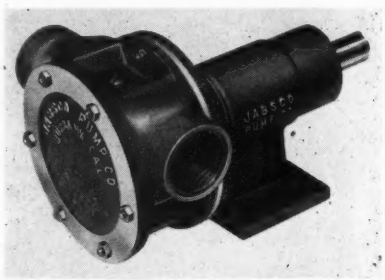
These new checks are designed for the moderate pressures and temperatures usually encountered in piping corrosive fluids. The valves are recommended for liquid or gas working pressures up to 150 pounds and for a maximum temperature of 350 degrees F.

Jabsco Introduces New Line

Just announced by the Jabsco Pump Company of 2031 W. Lincoln St., Burbank, Calif. is the new stainless steel (18-8 Mo., Type 317) pump intended primarily for use in chemical, industrial, dairy, bottling, and food applications.

Like previous Jabsco models it is extremely simple in construction, having but one moving part — a tough, flexible impeller made of a neoprene compound selected for its chemical inertness as well as toughness and wear resistance. The natural resilience of the impeller results in automatic compensation for wear in the pump body, and facilitates passage of suspended solids without jamming.

The pump primes automatically, operating suction being in excess of 27" of mercury. The self-priming feature is of particular interest for portable units and for intermittent transfer of active chemical solutions, and abrasive slurries. This eliminates any need to locate the be immersed in the liquid to be pumped or to provide auxiliary facpumps in sumps where they will ilities for manual priming. The liquid pumped provides automatic lubrication between the pump body and the impeller. The pump can be operated in either direction and mounted in any position without any change in efficiency. Positive action mechanical seal is provided. Bearings are factory lubricated and sealed and are adequately protected by ample drain holes and slinger ring. An unusually wide range of satisfactory operating speeds, from 100 to 1750 RPM offers a maximum of flexibility in driving arrangements.



Although larger and smaller sizes are scheduled for early development, the pump is available at the present time with provision for 1 ½" pipe connections only.

At 1750 RPM it delivers 55 GPM at 0 PSI head, and 38 at 25 PSI head. The pump is suitable for sustained operation up to 25 PSI. Slightly higher pressures permissible for intermittent and irregular operation. List price is $95.00 F.O.B factory.

Additional information is available on request from the manufacturer.

San Emigdio Adds Interest

Apex Petroleum Corp., Ltd., has staked location for its Los Lobos No. 2 in Sec. 5-10n-22w in the San Emigdio area of Kern County. It is 200 ft. north and 600 ft. east from Los Lobos No. 1, which was abandoned several weeks ago at 3511 ft. Continental Oil is drilling at 11,816 ft. with KCL No. 1 in Sec. 8-11n-21w. Santiago No. 1 in Sec. 8-11n-22w is boring at 7215 ft.

THIS LAUGH OFF!!

Teacher: "Where is the capitol of the United States?"

Johnny: "In loans all over the world."

Professor: "Didn't you have a brother in this class last year?"

Student: "No, sir, it was I. I'm taking this course over again."

Prof.: "Extraordinary resemblance, though, extraordinary!"

A young man was patiently waiting in front of the Post Office window behind which two female clerks were busy talking. "Her evening gown," said one, "was of metallic brocade, had a braided bow, and full sleeves." At this point the young man broke in with: "I wonder if you could get me a neat purple stamp with a perforated hem, the whole business treated with a coating of lovely mucilage and costing about three cents?"

She: "And after we are married, will you give me an allowance?"

He: "Assuredly, dear."

She: "A liberal one? So that I may buy anything I like?"

He: "Of course, darling. You may spend my money just as fast as I make it. Any other question?"

She: "Yes. How fast can you make it?"

"I like the shy, demure type," observed the sailor, "you know—the kind you have to whistle at twice."

Panting and perspiring, two Irishmen on a tandem bicycle at last got to the top of the steep hill.

"That was a stiff climb, Pat," said the first.

"Sure and it was that," said Mike. "And if I hadn't kept the brake on, we would have gone backward."

Golfer (to players ahead): "Would you mind if I played through? I've just been notified that my wife is seriously ill."

"Well, wot d'ya expect fer a quarter these days, chicken in the chicken soup?"

We've never been able to understand why women as pretty as those in the washing machine ads can't marry men who are able to hire the washing done!

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Jensen Pumping Units make friends quickly by demonstrating on the job that production costs can be cut.

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Kern County OIL NEWS

FORTNIGHT AND A WEEK ago it was the same old story. The same deal . . . Talk, talk, talk. What did they say? . . . That's the trouble, they didn't say. They didn't say "Yes" and they didn't say "No".

OUR PRICE RISE whisper of recent issues turned out to be more than vespers. . . . No one followed through or followed suit with Union. Everyone had the price rise jitters during the same period described above.

KERN RIVER OIL is worth $2.06 and more. Penn lubes in the East are paying $5.00 p/b (in some instances) we know about it all.

OUR LOCAL "GOLDEN BEAR" and others should be very busy as we shall probably learn in due time.

RUFF ON SOME smaller refineries . . . because bonuses have been paid.

IT WAS RUMORED IN KERN "Socony" thought price increase would not develop new **"oilworlds to conquer."** However, this has proven wrong kind of guesstimating in some quarters. Reason: Many wells going 10 now help pay the rate of production costs. Most wells average only about that much or maybe 15 b/d out of the 24,000 and more that have been drilled. . . . Someone says 7½ bbls.

KERN RIVER AGAIN, has taken idle wells that have not pumped for years, and since the price rise, new lumber patches up the derrick to "tank take" and signs of developing obtain. You can see it every day.

SHELL IS DOING A BIG job up East Coalinga's Eastside. Over 145 wells are being planned during the next two months.

OTHERWISE AND HOWEVER . . . most talk was over the annual season's greetings. The SCOUT XMAS party conflicts with the HI JINKS in Los Angeles. It nearly always happens.

WE HAVE NOTICED THAT the Independent Exploration Company threw its annual Xmas oilding. Also to **run is the annual CCCOP** who according to Barney Barnard which comprises the California Conservation Committee Oil Producers. Their party is February 17, 1948 right in old Kern County. So we heard . . . we could be wrong.

AND WITH EVERYONE not too serious . . . with Thanksgiving, Christmas, and New Years flirting with 4 to 5 holidays the moral in oil news from this county is twisting off to a new low with a lack of news too.

SAD NOTE INDEED is the passing of ROBERT WESLEY EVANS, California Employment chief of this facility. They say that Bob had the greatest ratio of different admirers from friends to strangers. The ratio made Bob a creditor person of human relations. None had to be imported to suffice the demand for his congenial services. He lived as he liked people . . . "great" . . . (humanly) . . . and fiercely . . . in life's good things.

BOB EVANS our neighbor . . . the last time we saw him he was throwing a string of colored lights over his own outdoor Christmas Tree. Just before, we heard him give a discourse on taking water from the Pacific, purifying it and sending it forth . . . into the great San Joaquin Valley. **Nothing** seems impossible since one acre of cotton in Kern thirty years ago was rated . . . "impossible for commercial production." Today over $25 million dollars are pouring as a cash crop is nearing its harvesting.

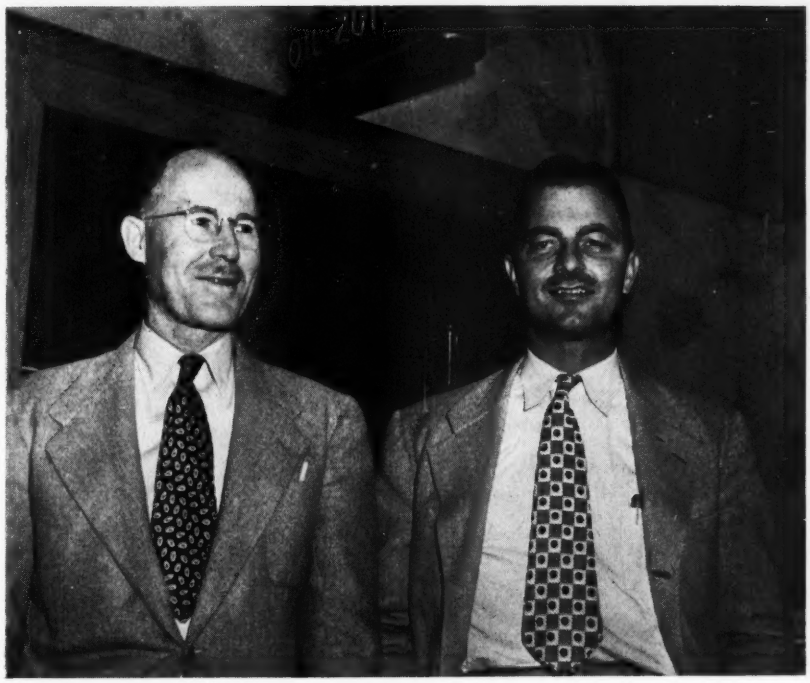
SAN JOAQUIN GEOLOGISTS met in Kern County's Bakerfield this month and from left to right are some of the reasons why the society goes forward: Dr. Moore, University of Kansas, who spoke at the autumn seminar, Art Huey from Shell, and J. Q. Anderson, Barnsdall Oil Co., outgoing president and secretary, respectively.

JOHNSON VALVE on North Chester Avenue across the street from the interests that scribe, has changed the ad which makes Kern Oil News possible. Our appreciation hereby in news is extended and tendered again.

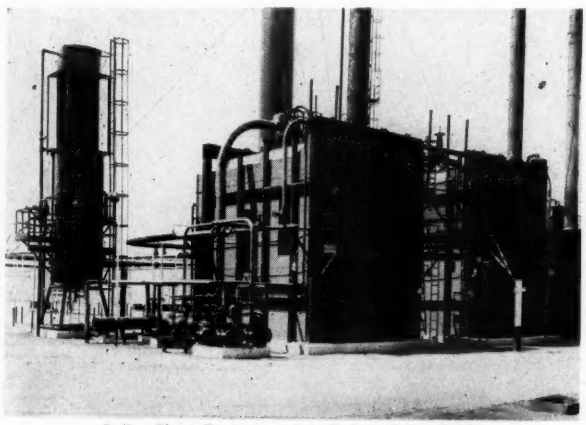
AT ELECTION the other night . . . a fort and a half of a night ago gave OHIO'S VALLET enough successful votes for San Joaquin Society of "Geogs" . . . to become the new chairman for 1948. (Ohio Oil Company . . . that is . . .)

HARKING BACK TO S.J.G.'s election the VP of the association elected was and is no other than JACK BEACH Vice Chairman for the petrowigs. And from the Barnsdall Oil comes J. Q. Anderson's name in print for the last time as he is outgoing Secretary Treasurer of the San Joaquin Geogs. BOB RIST chief scout of the Standard Oil succeeds him. ART HUEY from SHELL was the old chairman.

AT THE RECENT MEETING on the above captioned subject, it might be a fair gesture to include the fact that DR. MOORE from



NEAR THE OIL ZONE are Herm Weddle, geologist for Standard, and Bob Rist, "chief scout" and for the same firm. These men are proving up an oil zone as a regular routine of business. Annual San Joaquin Geological Society meeting at El Tejon indicated this to be of extra routine.



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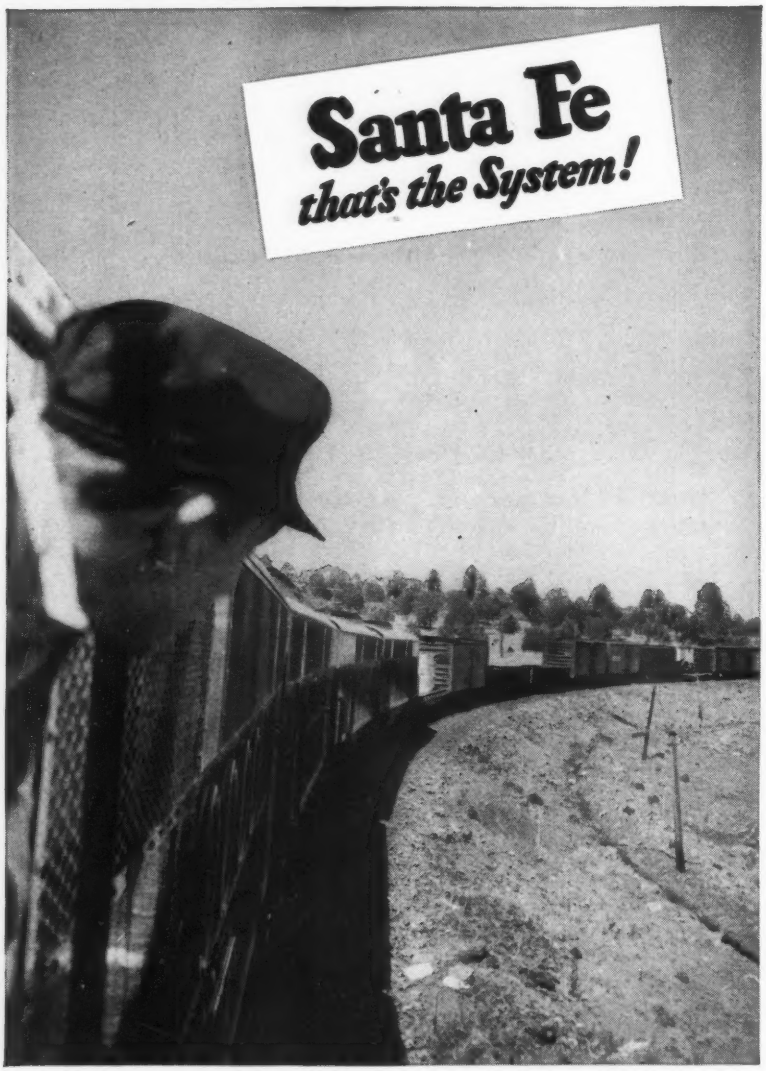

From cab of a giant Santa Fe freight Diesel locomotive trainman checks his train as it rounds a curve

Prompt car reporting made possible by Santa Fe's vast communication system, one of the largest in the world, enables us to keep in close contact with your carloads to assure on-time delivery. This is a big reason why more and more shippers are specifying routings via Santa Fe all the way!

Let your Santa Fe traffic representative help with your shipping problems.

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General Freight Traffic Manager, Chicago 4, Illinois

Santa Fe

the University of Kansas was the principal speaker. His theme and general philosophy were as one would think and often congesture went into rightful possession, somewhat "dissapatious" . . . of the potentials of certain natural resources and how to make them known.

MORE THAN ten percent of the Cowmen here on Convention consisted of oilmen. It all reminded us of the old Greeley Colorado publisher who said, "The Cowman is a Grand old Mug . . . in all his life no ditch he dug."

MODERN DESIGN . . . "yet all his life no oilwell dug. And so from verse to prose and wonderment.

MORE ABOUT ALBERT who used to be with Baroid as sales engineer in Calfiornia, Oklahoma and Kansas. In 1940 he went with Uncle Sam and served with the Coast Artillery in many branches winding up with the rank of Colonel after turning in a grand performance. Since VJ Day he has been with Long Beach Oil Development Company.

WE WENT OUT TO SEE BOVEY at WoSco the other day and found him eager to inventory improvements taking place with Western Oilfields Supply Company. In the first place everyone seems to be apprehensive of the demand for steel and the need for pipe of all kinds. There is a 24 hour activity at "99 Yard" with three shifts working under the direction of ELDON KIZZIAR as general shop foreman. We found out that conductor pipe is being made from the new shop extension . . . also, AND that shipments in carload lots to the six Western States include a very excellent product greatly appreciated. Doug Rappley at Fresno Branch of "WoSco" reports increasing demands for water well casing made at 99 Yard in Kern.

MASON HILL was out at the SJGS annual the other night. He had just returned from Australia where he spent some time on affairs of RICHFIELD. We didn't have a chance to get in on the kangaroo stories, but we have a picture of the huddle.

CHARLEY MANLEY has been in the ticket line at the Rose Bowl. His annual trek with OIL FIELD

CONSTRUCTION COMPANY and friends may be substituted with reservations along the Rose Parade. It seems that those on the "outside" are barred. First time we ever knew that Charley was that way . . . we always thought he was on the inside of everything. Anyway by the time this is news, Manley will have had his friends taking colored still pictures from behind wires from the parade grandstands. One year we were so excited doing that, we didn't realize we were behind wire fencing and today these masterpieces would make American Fence Co. very happy over a complete story in kodachrome.

FROM CZECHOSLOVAKIA this month returned STANISLAUS KRIZ after a three months leave from STANDARD OIL at Taft. To Prague and other points in and around near and far, and perhaps a peek about the iron curtain went STAN to have a look see at the old country. We have not interviewed him as yet but contemplate chatting with him at first opportunity.

WEDDING BELLS clanged for FRANK TALLMAN the venerable old bach of the good but doubtful single line wingback formation of the geologists and scouts of this country. DOROTHY GIFFIN was the one to say "yes". Our congratulations to the groom with best wishes to the bride.

DR. RAYMOND C. MOORE from the University of Kansas where he is professor of geology, was the principal speaker of the SJGS. The boys and scouts present enjoyed his talk. "Problems of Sedimentary Facies."

HARRY CROSSMAN the genial vice president and general manager of the Kern County Bank acknowledged birthday greetings to the bank and reported that President H. F. (Fred) Owen was mighty pleased over the results. Following the Bank of America KCB will pay a cent and a half on savings deposits. It's the bank's biggest year and 1948 is to be the banner of them all. The phenominal growth of the bank is not to be excelled by anything like it. Civic groups in Kern have passed resolutions to honor all firms reaching their Silver Anniversary as a result of this enterprise. Harry told us he was not concerned with too many plans suggested by the bankwigs of the East such as increasing cash reserves to ward off credit extension. KCB has always had an excessive cash position . . . in an independent bank it does not retard credit needs to the local demands . . . this helps in hard times.

FRED GREEN of TWA (Tide-Water Associated) has resigned ac? cording to our "moment" man who keeps us informed on affairs for the moment.

SAN JOAQUIN GEOLOGICAL SOCIETY held its annual event with election of new officers highlighting the affair. GENE VALLAT from Ohio Oil was elected the new chairman. He retired Standard's Art Huey, SJGS class of 1947, who had J. Q. Anderson, Banrsdall Oil as Secretary Treasurer with Herb McMasters, Honolulu as the "vc". GENE will have for the 1948 lineup JACK BEACH. as vice, and BOB RIST, SecTreas.

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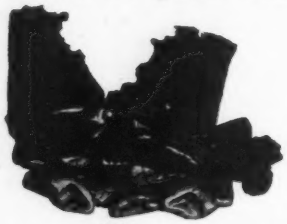

(Below) An assortment of Metal Junk

(Above) Rubber Sleeve, Slips, and Pieces of Body of Bridging Plug

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Kern Bluff Tests Ready

Ready to start are two test wells in the Kern Bluff area sponsored by Universal Consolidated in Sec. 7-29s-29e. They are called No. 29 and No. 40. In company with Oceanic Oil, Universal has made location for Needham-Bloemer No. 15 and No. 17 in the section. No. 26 came in the other day from 920 ft. for 75 barrels daily.

Kreyenhagen Wildcat Spuds

Texas Co. has spudded and is digging ahead at 455 ft. with Kreyenhagen No. 2 in Sec. 33-22s-16e in the Kreyenhagen Hills area of Fresno County. No. 1 proved a duster. In the McKittrick area, Westpet Unit One No. 36-29 in Sec. 29-30s-22e is drilling at 3977 ft. Westpet NCT One No. 87-29 is a location in the section.

Mendota Try Spot Coring

In the Mendota area in Madera County, Jergins Oil Co. is spot coring at 3045 ft. with Escarpedo No. 1 in Sec. 32-14s-12e.

Paloma Test Drills Deep

Western Gulf's L. A. Club No. 74-1 extension test in Sec. 1-32s-26e is drilling in hard shale at 11,960 ft. Nothing substantial has been penetrated to present depth.

Edison Wells Reconditioning

Macson Oil Co. of Beverly Hills, headed by A. B. McCloskey, is reconditioning three wells in Sec. 21-30s-29e in the Edison field, recently taken over from Wood-Callahan. The wells are Shearer No. 1, McIntosh No. 1 and Bloemer No. 1. The company is planning a new grass-roots job in the near future.

Olivera Try Digs

In the Olivera Canyon area in Santa Barbara County, Union Oil is prospecting ahead at 5702 ft. with Wickenden No. 1-28 in Sec. 28-9n-32w.

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Perfo-Jet Process

Byron Jackson Co. has announced a new casing perforating process known as Perfo-Jet.

The Perfo-Jet Process is an adaptation to oil field use of the shape charge which was the basis of the Bazooka during the recent war. The Perfo-Jet Process uses no bullets or abrasives, but pierces steel, cement and formations alike.

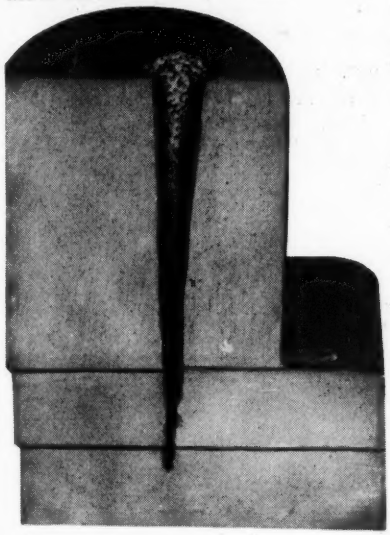

Figure II

Perfo-Jet is the result of intensive research by Byron Jackson Co., at their experimental station Signal Hill, Long Beach, Calif., and the technical staff of the E. I. du Pont de Nemours & Co. of Wilmington, Delaware.

The most important advantage is the penetrating power of Perfo-Jet. In test firing Perfo-Jet has demonstrated its ability to produce clean holes without fusing or compacting pores in the surrounding formation, as shown in Fig. 1. This photograph shows a clean ½" hole through two strings of casing, the cement and out through the 55 gallon drum.

Further proof of penetrating power of the Perfo-Jet Process is demonstrated in Fig. 2. Here are shown two blocks of mild steel in which the jet penetrated 4½".

This perforating process operates in a similar manner to the BJ bullet type perforating service. The BJ specially designed trucks and trained crews are used to bring this new perforating service to California operators only, at the present time.

Field results to date offer further evidence of Perfo-Jet's penetration.

Camarillo Test Fishes

Near Camarillo, Warren Oil Co. is fishing stuck drill pipe in its Janss Investment No. 1 in Sec. 28-2n-21w, Ventura County. Present depth is 3780 ft.

Zaca Scene Of Two Explorers

Tide Water Associated has two wildcats going in the Zaca area of Santa Barbara County. Chamberlin No. 51 in Sec. 38-8n-31e is drilling at 3837 ft. Luton No. 135 in Sec. 29 is making hole at 1328 ft.

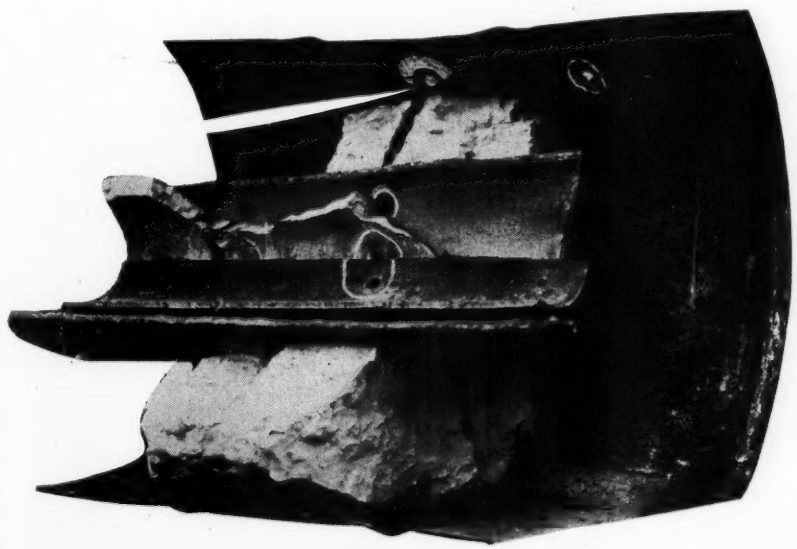

Figure I

Alondra Try Digs

General Petroleum's Alondra Comm. No. 8-1 in Sec. 16-3s-14w in the Alondra area is making hole below 7950 ft. Industrial No. 1 in Sec. 8-2s-12w in the East Los Angeles area is rigging up. Both derricks are soundproofed.

Val Verde Try Drills

Redrilling has reached a depth of 5612 ft. in Texas Co.'s Malis No. 1 test hole in Sec. 10-4n-17w in the Val Verde area, Los Angeles County. Original bottom is 8363 ft.

El Segundo Test Scene

Standard of California is going to further explore the area northwest of El Segundo with its Six Companies No. 4 just staked on Sec. 2-3s-15w.

Aliso Canyon Wildcat Grades

Grading for its Del Aliso No. 2 wildcat test in Sec. 29-3n-16w in the Aliso Canyon area is Standard of California. Frew No. 1-4 wildcat in Sec. 29-3n-16w near Newhall is drilling slightly below 8200 ft. Newhall L. & F. No. 5-1 in Sec. 34-4n-16w is spot coring at 8762 ft. Houghton Comm. No. 1 in Sec. 36-3s-12w on the outskirts of the Santa Fe Springs field is spot coring at 10,026 ft.

Athens Try Digs

Approximately 10 miles south of downtown Los Angeles, Shell Oil is drilling at 4754 ft. with Moser Comm. No. 1 in Sec. 12-3s-14w in the Athens area.

Huasna Project Fishing Junk

Drilled to 3064 ft., Danciger Oil & Refining Co. is now fishing junk in its Twitchell No. 1 in Sec. 35-32s-15w in the Huasna area, San Luis Obispo County.

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Shale Hills Try Rigs Up

Northeast of the Bacon Hills discovery well, General Petroleum is rigging derrick for Berry No. 11-15 in Sec. 15-28s-20e in the Shale Hills area. The company's Ninkovitch No. 62-9 in Sec. 9-30s-21e near McKittrick is spot coring at 5306 ft. Mud was recovered on formation test of the interval of 4800-5117 ft.

Oil Well Pumping

(Continued from Page 25)

for the production operator to detect fluid pound, pump bumping up or down, and correct these difficulties with little effort, also in case of pump sticking he can shack his well up and sometimes save a rod or tubing job.

Actually there are not many deep wells pumping. Most every time there is a unit installed on a deep well there are visions of gathering new data, but are informed that for the present they are only tubing it for 7500 feet.

Now that we have set up calculated examples let's look at some wells that have actually been pumped.

At Santa Fe Springs: 8000′ deep, 1¼″ plunger, 15 74″ strokes, 21% ⅞″ rods and 79% ¾″ rods, 165 barrels per day, two year run 2 rod breaks.

At Long Beach: 7300′ deep, 1-¾″ plunger, 1″ ⅞″ & ¾″ rods, 28,500 pounds rod load, 37,000 P.S.I. rod stress, 18 - 108″ strokes, 700 barrels per day, 7 years without a rod break.

Three wells pumped by same company as the preceding example, 7000′ to 7500′ deep, 1″, ⅞″ & ¾″ rods, rod stresses 35,000 P.S.I., one break in 7 years.

At Buena Park: Pump set at 9,960′, 1¼″ pump, 1830′ 1″ rods, 2100′ ⅞″ rods, 6030′ ¾″ rods, 11½ 102″ strokes 135 B.P.D.

While conventional pumping units are offered with stroke length up to 12 feet much discussion and consideration is being given to the development of longer conventional stroke units, possibly up to and including 15 feet.

In presenting this discussion on deep well pumping and pumping units, it may occur to some of you that more attention has been given to sucker rod design than to the unit, however it is next to impossible to discuss the pumping unit and its limitations without bringing rods and their limitations into the picture.

As rod manufacturers progress towards higher tensile rods and higher allowable stresses a wider range of flexibility and performance can be expected with existing conventional long stroke units.

Shell Story

(Continued from Page 13)

the discharge lines and flexible connections through ball joints to all derrick base lines. Quick opening and large volume gates allow the crew to clean or empty the mud tank with little lost time. Foot-operated valves are used on the flooded suction of each pump. The connection between the mud ditch and the mud tank is by means of a section of canvas ditch about 3 feet long. This canvas ditch is supported on steel hoops which slide on guides. Misalignment between the mud ditch and the tank is taken up in this section. The mud tank is divided so each pump has its own section and an inside mud ditch diverts the returning mud into either section. This allows the crew to mix chemicals into the mud or condition the mud in one section of the tank while the other section is supplying mud to the main circulating pump.

Derrick Lights

Sixteen 500 watt flood lights have been suspended from the four derrick guy lines. These lights are arranged so smooth, even, shadowless light is distributed over the entire working area, including the pipe racking platform in the derrick, the pipe rack, drilling floor, and the pump area. Four additional 200 watt lights are installed under the derrick floor for illumination of the under floor area.

At this time most rod manufacturers are known to be in the process of testing and perfecting 40,000# rods and because of this progress the conventional pumping unit industry will provide the oil industry with even greater latitude of performance in pumping wells of 8000′ or below.

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GREATER RIGIDITY

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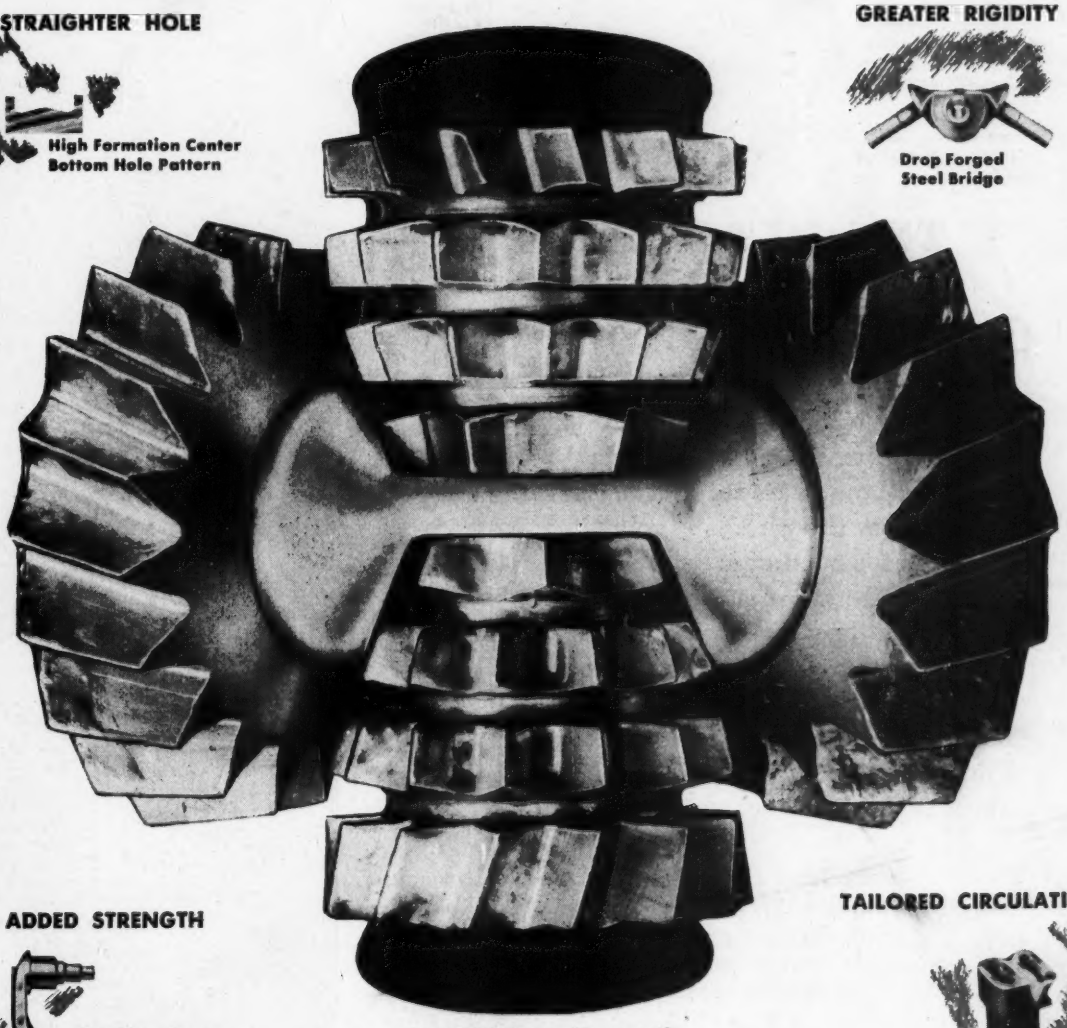
Steel Bridge



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One Piece Cutter
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For Medium and Medium Hard Formations

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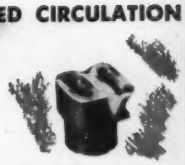

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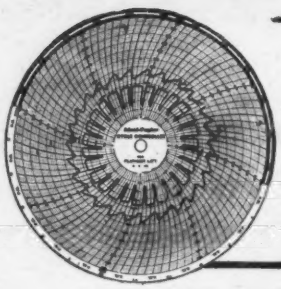
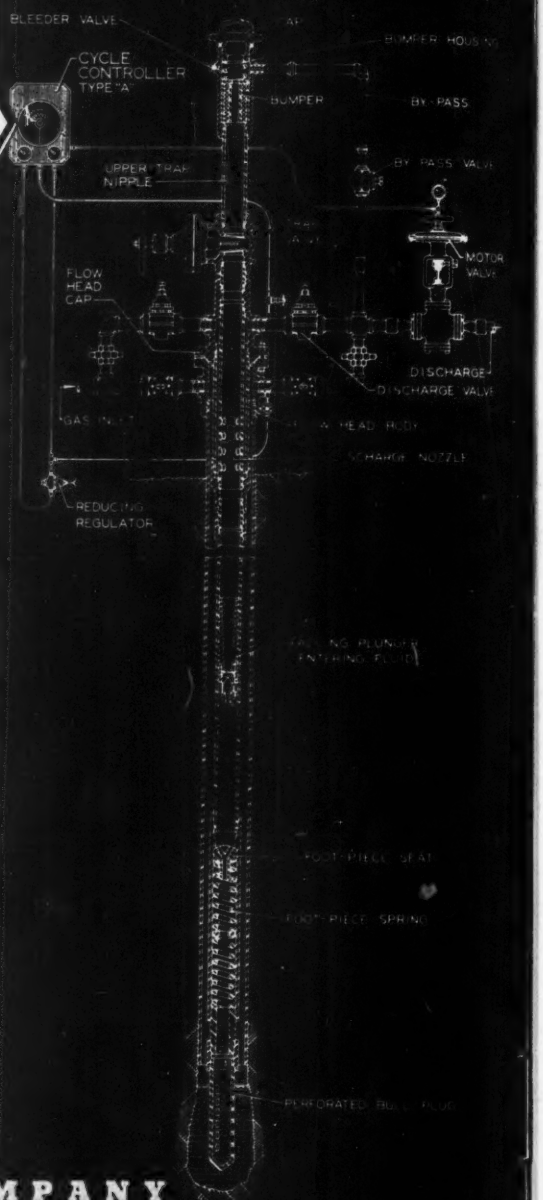


Note regularity of cycles made by the Cycle Controller



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With this NEW Cycle Controller, the Ideal Plunger Lift operates dependably in either HIGH or Low Pressure Wells, due to positive control over the plunger cycles.

It insures maximum utilization of formation or injected gas, resulting in lower cost of producing deep wells. Wax accumulation in the tubing can be greatly retarded.

NOTE: Spang-Chalfant specially drifted API seamless tubing is now available for Plunger Lift. Bulletin No. 317 will be sent upon request.

● *The Ideal Plunger Lift's cycle of performance is automatically regulated by the Cycle Controller, located at the surface, which governs the frequency of the plunger trips. It enables the gas to be used with maximum efficiency.*

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